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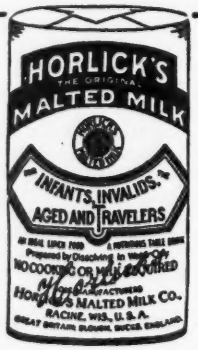

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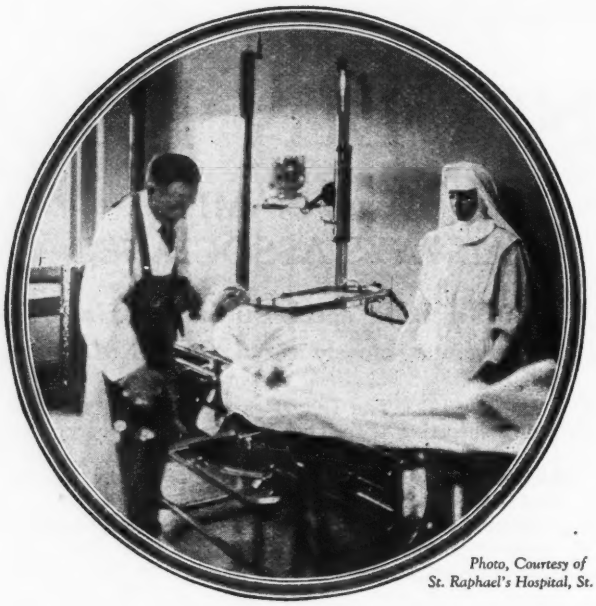

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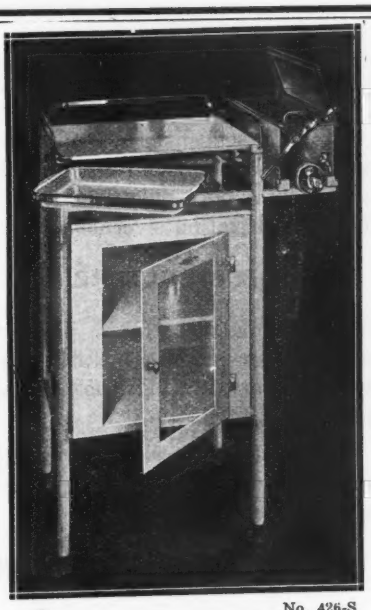

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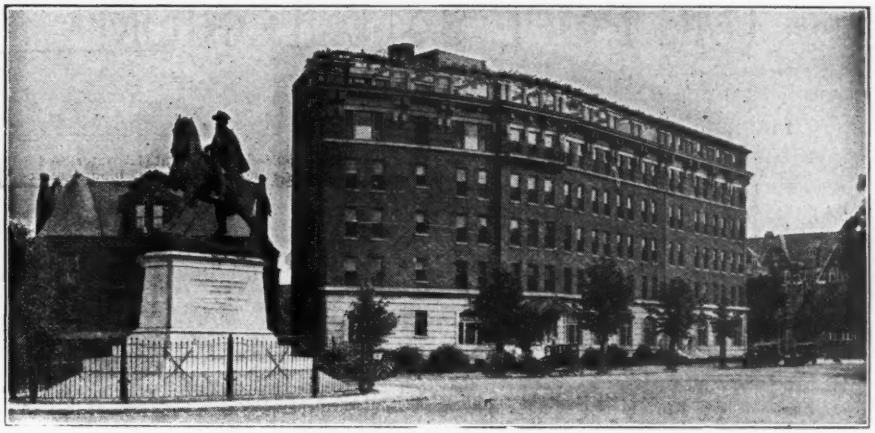

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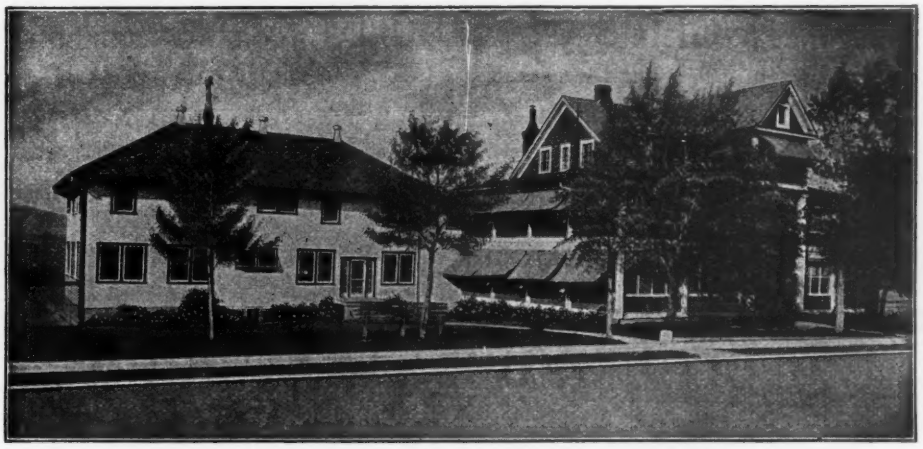

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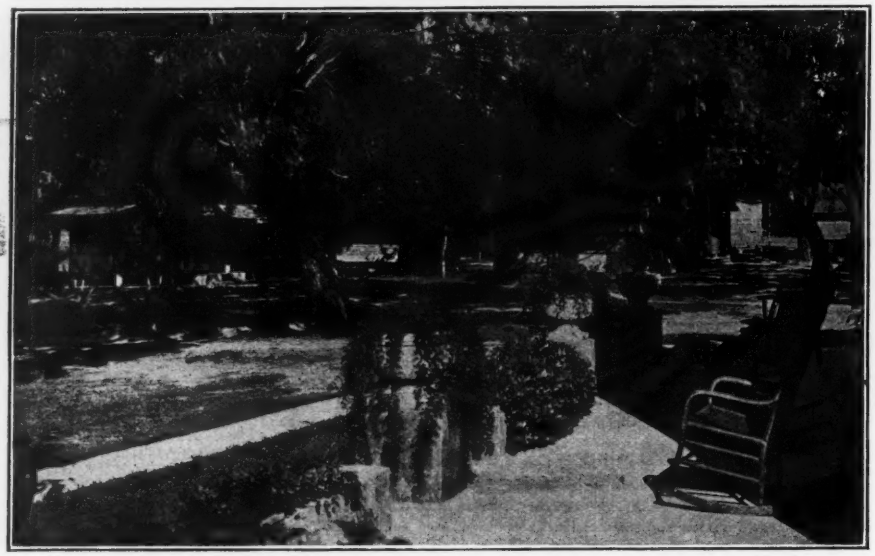

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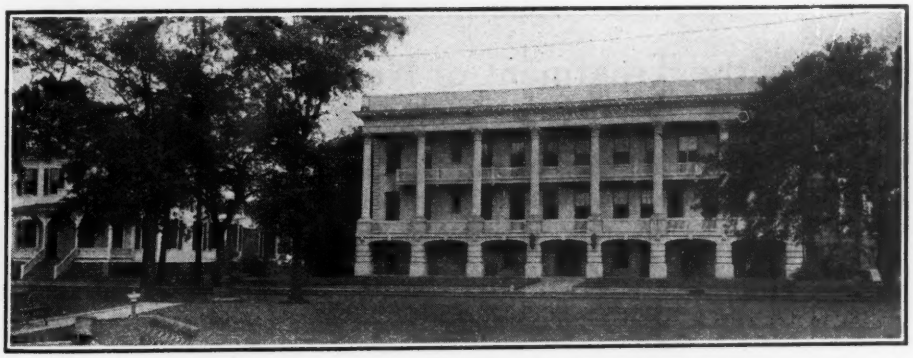

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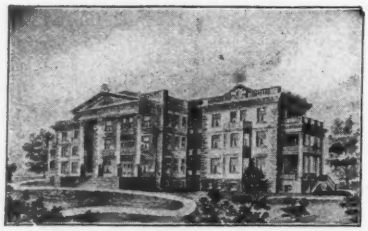

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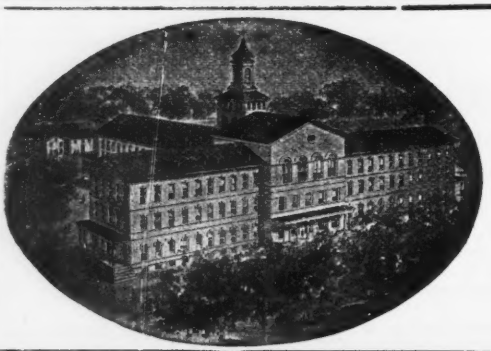

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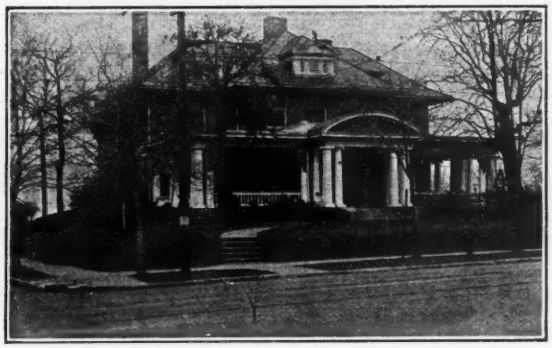

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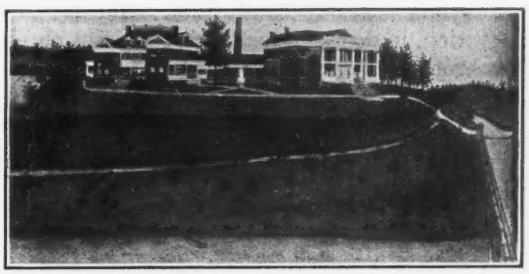

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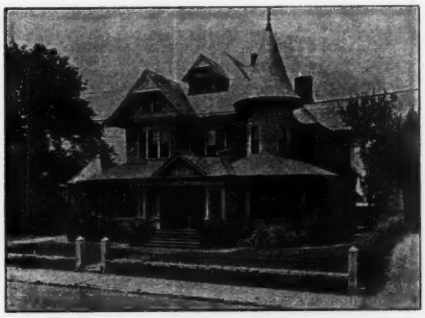

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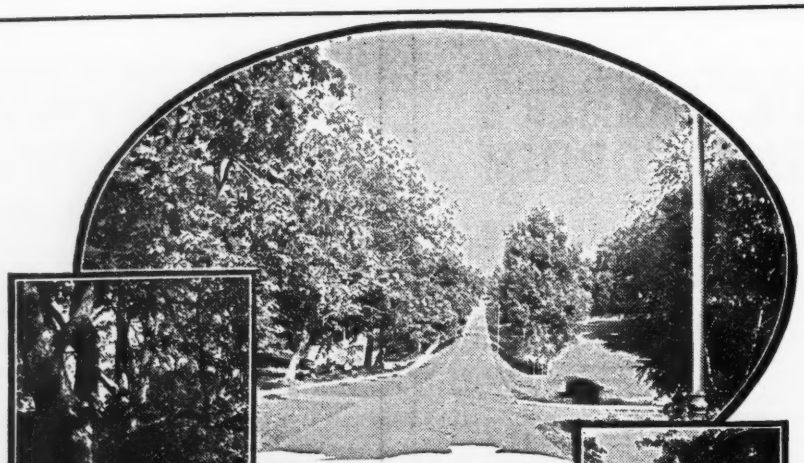

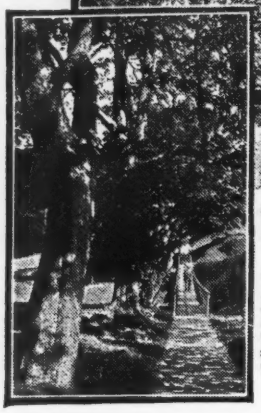

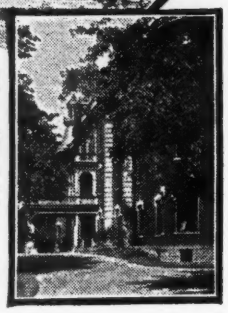

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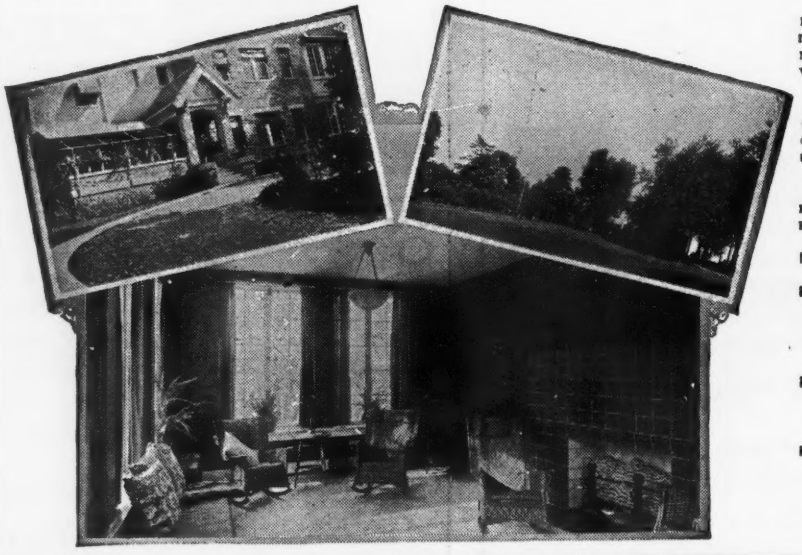

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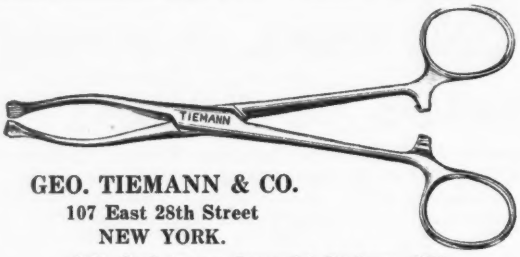

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MEDICINE

INTERNAL DISEASES, PEDIATRICS, NEUROLOGY, DIAGNOSTIC METHODS, ETC.

THE APHASIAS OF CHILDHOOD: CONGENITAL WORD-BLINDNESS AND WORD-DEAFNESS AS CAUSES OF MENTAL RETARDATION AND DEVIATION*

By E. BOSWORTH MCCREADY, M.D., F.A.C.P., Pittsburgh, Penn.

While language in both its vocal and silent forms is the common possession of man and animal, articulate vocal speech and the ability to convey thought by means of drawn or written symbols is the exclusive property of man. The nearest approach to articulate speech in other than human beings has been found in parrots who, it seems, of all birds studied, show the greatest intelligence. Green[1] has given numerous instances of extraordinary intelligence observed by him in both the parrots and parrakeets. He quotes a number of incidents of their behavior which might be taken psychologically to mean that these birds not only have the ability to imitate but also are capable of associating articulate speech with symbols, recognition of persons and simple forms. These are simple but unmistakable signs of thought processes. Many other incidents are quoted by Page[2] of the use of language of parrots, not only in a repetitive, but also in a rudimentarily intelligent way. Time and again these authors observed what appeared to be unmistakable evidence that some of these birds were able to understand a very little of what they were saying and used language not merely as an imitative automatic cry without intelligence, but by means of association and experience gave some sign of understanding a few of the things they uttered, and of being able to give expression by utterance to certain emotional states. In regard to studies of speech in monkeys Garner[3] was able to make out nine monophrastic sounds and one distinct phonetic sound in capuchin monkeys, all of which words, sounds, cries or calls seemed to be expressions of friendship, distress and fear. Garner believed that the speech of apes and monkeys as he heard it in their natural homes, the jungles in Africa, or in cages with experimental animals, was a voluntary articulate and deliberate use of sounds which they understood and which others of the same species replied to and understood. He believed that the higher apes, the gorilla and chimpanzee, had a higher type of speech than monkeys and that each race or species had peculiar calls of its own. He felt that the more gregarious the habits of any species the higher the type of speech it possessed. He was convinced that monkeys and apes understood his imitation of their sounds and he also seemed convinced with Romanes[4] that these animals were able to enumerate and to distinguish numbers of objects and to find errors in the sum total up to the number of seven when incorrectly presented to them. According to Garner the apes have a great number of words, thirty to thirty-five of which Garner was able to understand and imitate. These words, calls or sounds, are expressive of gratitude, warning, desire for food or drink, or are expressions of discomfort, fear or of greeting. He was convinced that chimpanzees also made negative signs with the head and were able to mimic the wavelike motion of the hand from the body as a sign of negation or refusal. He insisted that there was pitch and volume and tone to the voice of the apes in the production of their sounds,

*Read in Section on Neurology and Psychiatry, Southern Medical Association, Eighteenth Annual Meeting, New Orleans, La., Nov. 24-27, 1924.

changes in which were regulated to suit the varying conditions in which they were used, and that apes understood the value of sounds as a medium of conveying thought. Osnato calls attention to the fact that these observations have never been confirmed, either by a medical or non-medical psychologist and that they have been viciously attacked and ridiculed both in the psychological and lay press. In any case, however, it is evident that though some of the higher animals possess language to a considerable extent and articulate speech in a minor degree, man is the only one in whom it is highly developed and the only one capable of conveying thought by means of drawn or written symbols.

Language includes much more than speech. It is any method which conveys thought or feeling. Natural language consists chiefly of changes in facial expression as in crying, frowning, laughing, grimacing and includes gesticulation, gestures and imitation of actions. It contains elementary forms common to both humans and animals which, with others, are understood by persons of different races, nationalities, ages and degrees of intelligence. Without doubt these natural phenomena of language were the earliest form of human expression and they are the form of language earliest understood by the young child. He, from early infancy, is accustomed to hearing definite words associated with these signs and they are of inestimable value in the development of speech and of intelligence in general. Later they are retained to ornament, enforce and modify vocal articulate communication (speech) lending an affective element which might otherwise be lacking. The actor and orator grace and emphasize the beauty and vigor of their words with appropriate facial expressions and gestures. The young child obeys more readily when the command "come" is supported by beckoning finger and Owen Wister's "Virginian" accepts a vile epithet as a mere pleasantry if accompanied by a smile.

It is probable that the first utterance of the new-born child is a pure reflex due to the assumption of the physiological function of respiration and to thermic and static adjustment to a new environment. But accompanying this reflex act there is an affective element of discomfort and for long after, until inhibition is well developed, discomfort from any source brings the same response. Adjustment to the new envioronment with the addition of artificial warmth stills the cry and subsequently the infant's cry means not only an expression of discomfort but a desire for relief. Being essentially egocentric he soon becomes preoccupied with the sounds for which he is responsible and during the period when discomfort is turning to comfort he finds a certain satisfaction in these sounds and a pleasure in the movements of lips and tongue, organs which before seemed useless, except for the purpose of suckling, which also gave him pleasure. To the gutturals and vowels, the labials and dentals are added and for a time the infant occupies a considerable part of his waking time in practicing and perfecting himself in the making of these sounds, profiting much from imitation of his elders, who are usually willing teachers. Soon he begins to associate definite sounds made by himself and by others with objects and persons seen, felt, tasted, smelled and heard. He has already learned that he is capable of making sounds himself and when his mother uses definite sounds in connection with definite objects he attempts to imitate them.

Early in infancy it is determined whether the left or right cerebral hemisphere is to assume the dominant function in the control of speech. Some ninety-one per cent of all persons are right-handed and while left-handedness frequently occurs in several members of the same family and in the descendants of left-handed individuals this fact does not necessarily involve the influence of heredity as an explanation.

It is too much to suppose that our early progenitors understood the function of the heart and its importance as a vital organ. It, however, was the structure of which, during fight or flight, fear or joy, they were most aware. Impression of its hurried activity obtruded themselves upon their consciousness in all but the most extreme moments of preoccupation. It was but natural, therefore, that the less aware side of his body should be the one presented to danger, to assume the burden of protecting the other side which, to him, seemed to contain the most sentient part of his being. Thus the right side of the body, particularly the right hand, came to be more habitually used for the various activities of life. The baby is approached from the right, objects are placed in his right hand and very soon he begins to use the right hand to the frequent exclusion of the left.

Since 1906 when Marie published his iconoclastic papers upon the subject of aphasia the previous conception of the cortical localization of the zone of language with definite and constant division into special centers has received considerable revision. The later thought upon the subject considers the cerebral cortex as a

synthesis of various organs which do not have an exact correspondence with gyri and convolutions. Various areas in the cortex subserve certain elementary functions which are but one phase of many psychic activities. These elementary functions of the various cortical areas consist of sensations and memories and when these are synthesized by a series of successive integrations the highest types of psychic activity become possible. Distinct cortical areas exist only in primitive animals capable only of the common elementary functions. In various species there exist evolutive areas which have the function of elaborating elementary functions peculiar to the species, as those of speech in man. The cortex, therefore, is divided into primary zones and evolutive zones and every psychic process results from a successive integration of these elementary cortical areas. A complex mental process manifests itself through the integration of many or all parts of the cortex with the inevitable participation of the evolutive zones. Thus there cannot exist a center for memories isolated from the fields involved in sensation and perception, even though it be granted that these two last phenomena may be activated in different layers of the same area. Perceptions and memories which are habitually presented to our consciousness are already synthesized processes and not elementary sensations, and for this reason their localization is to be found in their elements, the areas for sensations and memory images, and perceptions result from a fusion of sensations and memory images.

Every psychic process must be considered as a reflex resulting from the simultaneous synergy of various cortical areas, some with an afferent phase, some with those that are intermediary, and one efferent, all of which vary in complexity. There is no psychologic or anatomic basis for the concept that the more highly evolved functions reside in certain definite, more or less autonomus, centers. Ideational centers, distinct from areas in which the elementary functions are localized, do not exist, nor do there exist definite circumscribed centers of association, intelligence, emotion, memory, will and consciousness. These faculties have no foundation other than our sensations, their respective residual memories and the associations between them. Even so, small circumscribed lesions may alter general function by interfering with elementary functions and effect movement, inhibition and automatism (diaschisis).

Not every psychic reflex arc results in an efferent motor phase, for some activate attention and inhibition, while others simply modify the emotional state or consciousness itself. But all psychic phenomena are essentially of reflex character, activating many portions of the cortex through numerous intracortical and subcortical connections.

The cortical areas concerned more directly with language are the evolutive areas, which are further differentiated by their periods of development, both philogenetic and ontogenetic. The original of these areas is the auditory area, with the zone of Wernicke in the posterior portion of the first temporal lobe. The secondary area is the verbomotor in the foot of the third frontal. The third field in point of development of language is the verbovisual at the angular gyrus. Doubt exists as to the existence of a graphic area (chiero-kinaesthetic) which directs the movements of the hand in the act of writing, said to be located at the foot of the second frontal, and the citro-architecture of this area shows nothing characteristic. Besides these important primary areas, there are subsidiary areas which have been studied by Henschen especially. These are the musical-sensory (vocal) and motor (instrumental), the area for the recall of number images and for designs and colors. It must be remembered, also, that language is but a means of expression, and closely allied, therefore, to other modes of expression, such as mimicry, gestures, the assumption of attitudes, etc. These functions are represented in cortical fields, which might be termed parallel areas. However, language cannot exist as an isolated cortical function. The primary verbo-auditory area, for instance, cannot be artificially isolated from the various sensory and motor areas with which it synergically functions. Nor can the secondary verbomotor area act alone without the assistance of the entire motor area of the cortex (ascending frontal), especially the lower portion. These areas, which are essential to the functioning of the special areas for language might be termed associated areas. Again, the function of language depends also on the integrity of extracortical mechanisms, such as the internal capsule, the subcortical ganglia and the brain stem. It may be seen, therefore, how inadequate is the conception of a single circumscribed center or centers for language. In certain moments, the function of language may be determined only by the activity of the entire brain. The data supplied by architectonics of the brain, according to Roncoroni,[5] bears this out. Von Monakow showed that aphasia may be explained only on

the basis of these studies. He was the first to insist that the conception of cortical centers containing representations of words was a false one. Verbal images are complex formation, and in the single cortical areas nothing is possible except elementary functions, and only by a complex synthesis of these functions is a verbal representation possible.

Thus far I have only discussed the development of the ability to recognize spoken words and their reproduction in speech. In the very young child and in the illiterate the faculty of language goes no further than this except in the acquisition of greater proficiency. Civilization, however, even of crude degree, has added the ability to recognize written or printed words and to reproduce them. The existence of a special area for memories of words seen, at the angular gyrus, has been mentioned, also the postulated existence of an area for the graphic reproduction of words, at the foot of the second frontal convolution. These more artificially acquired language abilities are of tremendous importance in the development of the individual's intelligence and in his usefulness as a social unit. With the development of the last two functions or abilities and their associations, the continuity of the zone of language is completed.

In the earlier days when the theories of the existence of autonomous speech centers were current, diagrammatic representation was easy and convincing. Now, however, when we accept the conception that speech and intelligence develop apace and occupy the same seat in the brain, diagrams are of value mostly to show the relationship and interdependence of the various functional components of language and to illustrate the methods to be used in education and in re-establishment of function. It is, of course, not to be denied that there exist, in the cortex, association areas for the retention of memories and concepts, visual, auditory, olfactory, proprioceptive, kinetic, etc., and that close to the area for the movements of the organs of speech there exist more or less closely grouped association cells and fibers which are concerned with their movements in speech. However, these purely motor areas are connected by many complicated and intricate association pathways reaching all parts of the brain. It is only by the use of this elaborate and highly evolved mechanism that the individual is able to express thought in language, whether it be articulate speech or by writing, reading, the assumption of attitudes, the expression of the face, a change in intonation of voice or by laughing, crying or shouting. Osnato[6] says:

"It is probably true that in a small percentage of individuals the process of learning, with the development of intelligence and speech, has been so exactly similar, that in them cetain lesions interrupting definite pathways may give similar defects in the process of thought expression in speech, and that in this very limited number the use of the words motor and sensory aphasia, agraphia, alexia, etc., as sharply limited aphasic defects depending upon the conception which those words imply, is justifiable on purely anatomical and pathological grounds. On the other hand, it is our belief that in a much greater number of patients the process of the acquirement of speech and intelligence has been so irregularly different and individualized that to talk of patterns and any longer to hold the diagrammatic conception of speech as a function localized in definite centers is impossible and unscientific and is in contradiction of all our anatomical and pathological data and our knowledge of the development of speech in children and articulate utterance in intelligent animals."

In view of the fact that the modern view includes the evolutive areas as an important element in its conception, and that it admits the existence of definite language areas in a small proportion of individuals it would seem that a diagrammatic presentation of the subject is not without value. Up to the present, conclusions regarding the faculty of language have been based upon studies of its development in normal children, in animals and upon the phenomena of aphasic disorders in adults. It may be that study of the class of cases which form the basis for this paper may throw some additional light upon the subject and serve to accentuate the importance of the so-called "evolutive areas," which pretty closely correspond to the speech centers of the older writers.

Although a voluminous literature on the subject of aphasia in adults has grown up since Brocas' epoch making contribution in 1861, the subject of aphasic conditions in children received but scant mention until 1896 (June) when Kerr[7] in the Howard Essay of the Royal Statistical Society referred to this subject as follows: "Almost unique cases are found with most bizarre defects. Agraphia, for instance, may be unintelligible to a teacher, especially if it occurs, as in one of my cases, in a boy who can do arithmetic well so long as it involves Arabic numerals only, but writes gibberish in a neat hand for dictation exercise; a boy with word-blindness who can spell the separate letters is a trouble; another who only since his ninth birthday began to speak intelligently, although understanding all said; another who, though not imbecile, hears well and is dumb.

These are extreme cases, but slight cases are also met with." Later in the same year (Nov.) Pringle Morgan[8] described a case of congenital word-blindness. The occurrence of special and isolated difficulties in language ability in children was noted, however, long before this. Clara Harrison Town[9] in her excellent article of 1911 in which she gives a comprehensive historical review mentions that Gall, as early as 1828, in writing of memory, differentiates the process into distinct faculties, among them noting "word memory" and the "sense of spoken language" and describes these functions in diseased conditions, anticipating the "word-blindness" of Kussmaul and the "motor aphasia" of Broca. He also describes faulty speech memory in children giving a clear clinical picture of that form of what we now call congenital aphasia. He says (I quote from Town):

"There are many children from two to twelve and even fourteen years of age, who do not speak to the same degree as other children, although they understand well and although they are far from being idiotic. In these cases the trouble lies not in the vocal organs, as the ignorant sometimes insist, and still less in the apathetic state of the subject. Such children on the contrary show great physical vivacity. They not only skip about, but they pass from one idea to the other with astonishing rapidity. If one holds them and pronounces a word in the ear they repeat it distinctly. It is difficult to make this experiment twice in succession and it is impossible to do it three times, which proves a general feebleness of the organs of the intellectual faculties. Sometimes, however, such subjects are able to express in writing their ideas and sentiments well enough to prove that their weakness in intellect is particularly relative to their faculty of speech. When these children are treated by a method of curative tonic, not given tasks too difficult or too long continued for their feeble faculties, as they grow older their cerebral parts acquire more consistence and their intellectual faculties develop little by little and they end by acquiring the faculty of speech and taking rank among reasonable persons."

Gall apparently not only recognized the condition but also differentiated those who were feeble-minded from those with otherwise normal intelligence. Benedikt, according to Kerr in 1865 described an intelligent boy who heard and understood, but could not speak beyond saying "papa" and "mamma." Town mentions a case of word-blindness associated with very limited powers of speech reported by Broadbent, in 1872. She quotes Broadbent as saying:

"The difficulty was obviously not articulatory, on the other hand the boy was not an idiot in any sense and was not speechless through a general lack of intelligence. He understood what was said to him and copied printed words and written characters, but had not apparently associated the written sign with verbal sound so as to understand written and printed words, though, curiously enough, he did this in the case of numbers. The failure seemed to me to consist in an absence of the faculty of mental rehearsals of phrases."

Wilbur, according to Town, in 1867[10] reported four cases which appear to be congenital. One a boy of thirteen, mentally slow, spoke only a few words; he learned to read, then to write and finally to speak. One, a boy of eight without voluntary speech, understood spoken words and learned first to read and then to speak. The third boy, also eight years of age, understood both spoken and written language, but never spoke voluntarily and could only repeat single words with difficulty. The fourth case, also a boy, did not attempt to speak until nine years of age and at thirteen spoke but a word or two. He was taught to read, write and speak distinctly. Kerr also mentions that Waldenburg in 1873, records as hereditary aphasia a hemiplegic and asphasic mother, who gave birth to a boy, hemiplegic and aphasic with hemiatrophy of the tongue, and states that he has been unable to meet any other case of hereditary aphasia in literature and Clarus, in 1874, writing on aphasia in children, quotes these two cases and adds one of a likely feeble-minded child. Kerr properly doubts that these cases should be included in the group now under discussion.

The early cases reported were motor and auditory in character. That of Broadbent was apparently the first instance of word-blindness in children to be observed. Since 1896, when the valuable contributions of Kerr and Morgan were presented, word-blindness has created more interest, though this condition, like other aphasic conditions in children, has not received the general attention among physicians and educators that the importance of the subject deserves. For, as I attempt to show in this paper, special disabilities in the zone of language, are very common and exert a great influence, not only upon the facility with which a child acquires an education but upon his whole mental and affective life and very often result in his being regarded as feeble-minded, leading to institutionalization or to alienation from his fellows.

In 1909 I[11] reported the first instance of aphasic condition that had come to my attention, a case of word-blindness associated with stuttering. At the same time I reviewed the existing literature on word-blindness in children in which I found forty-one more or less well defined cases, though I included several which I would not now consider as congenital in origin. The matter of differentiation between congen-

ital and post-natal cases will be taken up later. Of the forty-one cases of which I was able at that time to obtain more or less detailed accounts, all but five had been observed either in Great Britain or in this country. Of these five, two were from Buenos Aires, and one each from Holland, Bavaria and France. This preponderance of cases among English speaking people was to me more a question of diagnosis than of incidence, though Claiborne[12] attributed it to the more arbitrary pronunciation of the English language. I considered that the first reports of this condition having been circulated through the English journals, it would be but natural that the condition would be more sought for by English readers. With more widely disseminated interest in the subject however, reports of cases from localities where languages other than English are spoken appeared in the literature and it may be noted that Warburg (according to Kerr) in Cologne found fourteen cases in two thousand ordinary school children and seven with a similar defect among four hundred in special schools. This rate of incidence is higher than that of Thomas[13] who, in 1905, upon the basis of observations in the London schools, estimated that one in two thousand elementary school children may be expected to show word-blindness to a considerable extent.

It is interesting to note that boys seem to be the more frequently affected. In the forty-one cases of word-blindness I have mentioned but seventeen per cent were in girls and Wallin[14] found eight instances in boys and two in girls among four hundred and thirty consecutive cases examined by him in the Psycho-Educational Clinic of the St. Louis public school system.

As will be seen from the above comments, the statistical information regarding the frequency of aphasic conditions in children is rather meagre and will remain so until the possibility of its occurrence is more generally recognized by those who come in contact with backward and supposedly feeble-minded children. Even the minor degrees leading to delayed and impaired speech and difficulties in reading and number work should be recognized in order that appropriate special training may be given. It is my personal opinion that the condition in varying degrees of severity is quite common and that teachers and others should know this and modify their methods of instruction accordingly. Even a physiologically slow rate of development of any of the elements making up the zone of language requires special methods of teaching and educators should be prepared, through a knowledge of the fundamental principles involved to meet the situation in an understanding way. The cause of aphasias occurring in adults is comparatively easy to ascertain, as they are the result of cerebral damage of some sort, hemorrhages, abscess, encephalitis, tumors, thromboses, emboli and acute edemas. While the differential diagnosis will, sometimes, present considerable difficulty, yet it is assured that the lesion is a gross one that has occurred in a previously non-aphasic individual. With those, however, whose aphasia dates from an early age the problem is more complex. My own tendency for some time has been to consider most of these cases as due to ontogenetic causes, a biological variation,[15] a stigma of degeneracy similar to that in such conditions as color-blindness, defective ocular fusion sense, etc., and that only exceptionally was the cause one with definite pathology. Since then I have had reason to modify my views somewhat. The results of recent investigations into the frequency of cerebral hemorrhage in the new-born should, however, make us consider whether an aphasic state may not perhaps be often a residual of damage at birth. Sharpe[16] in a recent valuable contribution on "Intracranial Hemorrhage in the New-Born" reports the results of lumbar puncture performed upon one hundred consecutive babies born at the City Hospital, Welfare Island, New York City. He was surprised to find free blood in varying amounts in the cerebrospinal fluid within twelve to forty-eight hours after birth in nine of the hundred; that is, in nine per cent. With the exception of four cases, these nine births were apparently normal and the babies themselves appeared to be normal, there being no marked signs or symptoms of an intracranial lesion. The amount of blood varied from merely a reddish tinge of the cerebrospinal fluid in five cases to that of almost pure blood in four. Five other cases with blood-streaked fluid were excluded because an immediate second puncture, one lumbar interspace higher revealed clear fluid, showing that the blood was due to the puncture itself. In four of the nine babies the intracranial hemorrhage was of large amount, a seven months' baby revealing, at necropsy, a right ventricular hemorrhage and another having a subarachroid hemorrhage with extensive cerebral edema. It was impressive to observe in the two surviving patients with extensive intracranial hemorrhage, only the so-called mild clinical signs, drowsiness, refusal to nurse and no muscular twitchings. In three of the cases of intracranial hemorrhage of less degree, there were present no marked demonstrable signs indicative

of a serious intracranial lesion. In these nine cases forceps were not used, though a low forceps delivery was performed in fifteen cases which showed a clear cerebrospinal fluid. One case was a breech with version and extraction and in one case the cord was about the neck. Otherwise the labors were what is usually considered normal.

Taking the above highly significant facts into consideration it would seem to constitute a rather fine point in diagnosis to determine whether a given case of juvenile aphasia, seen first perhaps at eight, ten years or later, is the result of a biological variation or of birth hemorrhage, this especially when other indications of cerebropathy do not exist. In any case, however, the term "congenital aphasia" is a suitable one. I might mention here that objection has been made to the use of the term "word-blindness" and "word-deafness" in the class of cases under discussion. To designate juvenile word-blindness Johnston[17] used the term "developmental alexia," Claiborne "congenital smybol-amblyopia," Variot and Lecompte[18] "congenital typhlolexia" and Witmer[19] "amnesia visualis verbalis." While any of the terms may be scientifically more exact than those used in this paper, yet "word-blindness" and "word-deafness" are good robust sounding terms, sanctioned by usage of the earlier observers and are the terms which will most likely survive in a medical literature already highly encumbered with verbal complexities.

The influence of a hereditary tendency has been stressed. The mother of one of the cases reported by Thomas stated that in spite of every advantage she herself had never been able to learn to read, and five other children in the same family had the same difficulty, the sister of another patient could do everything when she left the special school but read. He also noted two cases occurring in brothers. A maternal uncle of Fisher's[20] patient did not learn to read until he was ten years of age and even in adult life was a very poor speller. Stephenson[21] notes a case in which the condition affected three generations of a family, passing from the first to the second generation by an affected female, and from the second to the third generation by a female, herself unaffected. Hinshelwood[22] reports cases in four brothers and Plate[23] four cases in three generations of one family. I have myself noted four instances of word-blindness in two generations of one family (father and three sons) and in one of the cases to be reported later the father of the boy has never learned to read except imperfectly. In another the father could read, in spite of every advantage, but little until he was ten years of age though he is now a brilliant and prominent member of a profession in which much reading is a *sine qua non,* and a brother (of the father), now a judge, could not speak plainly until he was ten years of age and their father and a paternal uncle, both men of high intellectual attainments and one a writer of verse of unusual excellence, suffered from the same language difficulty until late childhood.

This apparent familial tendency is evidence in favor of the importance of biological variations as a frequent factor in the etiology. For reasons too obvious to be detailed, whatever defects exist in these patients can not be verified in ordinary practice. The mortuaries of the institutions for the feeble-minded, however, offer a fertile field for study, if note is made during the life time of the individual of his language difficulties, for variations in this faculty are more common among these unfortunates than among intellectually normal individuals.

For discussion of the symptoms and diagnosis of aphasic conditions in children it is well to give separate consideration to the different varieties.

Delay in the acquisition of speech may be due to a physiologically slow rate of development, to deafness resulting from peripheral lesion, or to word-deafness. Children who are dumb without being deaf for ordinary sounds are not infrequently met. Sometimes they are able to enunciate a few definite sounds which they use in connection with definite objects or affective states. In others all inclination to speech seems to be lacking. A quite common variety of imperfect speech is the condition to which the term "idioglossia" has been applied. Of this condition Bastian[24] says:

> "Some curious cases of congenital speech defect were described by Hadden, to which the term 'idioglossia' has been applied. These children have, to a certain extent, a language of their own, so that when asked to repeat phrases they make use of different, though definite, sounds instead of those proper to the words that should be employed. The sounds which they substitute are said to be always the same for the same words."

Guthrie[25] devotes an entire chapter to this condition in his book published in 1907 and after reviewing the cases to be found in medical literature, he reports in detail a number which had come under his own observation and concludes that the term "idioglossia" is legitimate as representing the condition of a well-marked group of cases; that it is neither a spontaneously invented language nor an example of atavism, nor a "sport" in language and is not to

be confounded with baby language nor with the language of imbeciles, though it bears a superficial resemblance to these, and is not evidence of weakened intelligence. He believed it due to congenital deficiency of audition not amounting to deafness with no more pathologic basis than an absence of a liking for sport, or a taste for art, or a sense of humor. In 1910 I[26] first mentioned my belief that "idioglossia" is due to partial word-deafness. In this condition the speech is unintelligible except to those who are in close contact with the child, as the mother or nurse, who for the reason that definite sounds are always used in connection with certain objects or states of feeling. It is interesting to note that young children can practically always understand and interpret the speech of those affected with this condition, even upon their first meeting. The child with "idioglossia" repeats sounds as he hears them.

In all grades of word-deafness the prognosis is good as to the ultimate development of perfect speech, especially under special training, the principles of which will be discussed later. Under the repeated associational stimulus either the cells concerned with the hearing and memory of words develops or a compensatory development of other cells takes place. It may safely be stated that wherever even the rudiments of speech exists the variety of aphasia present is word-deafness rather than motor in character. In motor aphasia in young children vocal expression is limited to its most rudimentary expression, crying, grunting and perhaps the use of a few definite sounds which, however, are used indiscriminately. Thus in a girl of eight referred to me by Dr. William Sharpe of New York, with a history of birth hemorrhage borne out by the presence of a cerebrospinal fluid pressure of 20 mm. of mercury, the speech was limited to the one word "no," which was used even when "yes" was indicated by an affirmative shake of the head.

About half of word-blind children are also letter-blind, as in George T., reported in a previous communication, who called *z, s,* could not name *e* at all, called *r, b,* and *p, r, l* he named *t,* and *t* he read *f.* This boy of thirteen could not read even the simplest words correctly, calling dog you, and yes our. Larger words he would not attempt. He, however, could readily recognize all numerals and read music with ease. Sometimes figure-blindness occurs in the absence of other special defects though no clear-cut case of this condition has come to my attention. Some individuals, however, never attain the ability to visualize figures in combination readily and this is a frequent cause of difficulties in mathematics. Bastian, in discussing the aphasias of adults, mentions that

"On rare occasions it has been found that loss of ability to read and comprehend numerals exists in the absence of word-blindness."

The early cases of word-blindness were all reported by ophthalmologists, to whom the children were taken to determine whether a visual defect were the cause of the inability to read.

Aphasic conditions, especially word-blindness, leading to retardation in school are frequent sources of behavior difficulties and Augusta Bronner of the Judge Baker Foundation, Boston, in her book, "The Psychology of Special Abilities and Disabilities," reports in considerable detail a number of cases in which there seems to be a definite relationship between the two. Inevitably the emotional life of the individual is harmfully affected, more acutely so in some instances because of an inherent tendency to emotional instability. The following case, which I have had the opportunity of studying for the last year and a half, through the courtesy of Dr. Theodore Diller, illustrates the difficulties encountered even when the condition is not extreme. This boy was seen at the Mental Health Clinic of the City of Pittsburgh and was presented before the seminar in November of this year by Miss Katherine Wolff, psychiatric worker in charge, as follows:

Case 81.—M. F. Our case is that of a boy eleven years, five months old, white, American. In it we have endeavored to illustrate the inferiority complex, showing how heredity, physical handicap, the parents' attitude, and the school have played a part in conditioning the patient, and the attempts made toward adjustment through the Mental Health Clinic.

The patient's mother came voluntarily to the Clinic March 21, 1923, and told us the following story: Patient had always had difficulty in getting along in school subjects requiring language, but especially the last year. The teacher and principal think he is defective and take delight in shaming him before the class, having openly called him crazy. This has reacted very unfavorably on the patient, who is a timid, extremely sensitive sort of boy. When asked to recite and at examination times, he is so overcome with embarrassment and so fearful that he fails utterly. He is not going to be promoted and is keenly distressed as he is overly conscientious and ambitious. He is very clever with his hands, has shown ingenuity in making cupboards and shelves and in mending all sorts of things that get broken about the house. She knows he is not stupid and wants to be able to prove to the school authorities that patient is not feeble-minded. He started school at the age of five, was one year in the first grade, two years in the second and third grades each, and has been one year now in the fourth.

The mother tells us that she is the agrressive one of

the family, patient being an exact replica of her husband, who is a very timid man, lacking in self-confidence. As a child, he also had great difficulty in learning to spell and read, and so was made the butt of the class, and he recalls vividly painful incidents in his childhood when he was made to feel his short-comings. When strangers come to the house or even people whom they know well, her husband is easily disconcerted, shows at times speech difficulty in pronouncing syllables, though when the family are alone, he can talk intelligently and fluently.

She has noticed this same trait in the patient, remarking at times his choice of words and lack of expression. The father is a tailor. Until very recently he had worked as an apprentice for low wages. She felt he was capable of going into the business for himself and insisted that he make the change. So far, he has been successful.

Patient is the oldest of five children and the only one who resembles his father. His developmental history is normal in every respect. As the family live in a very undesirable neighborhood, on the outskirts of Homestead, the children come straight home from school and play only with each other. The father being of retreating disposition, does not enjoy mixing with people and they live almost entirely to themselves.

The patient was seen at the Clinic in March, 1923, and has reported at regular intervals. A psychometric showed a mental age of eleven years, eleven months, with an intelligence quotient of 1.04, according to the Stanford Revision of the Binet-Simon Scale, with a fourteen year or average adult level in practical ability, as shown by the Porteus Mazes.

Physical examination was negative. In the doctor's opinion, the patient's language disability was diagnosed as congenital word-blindness or defective sensory association. To overcome this, weekly lessons were arranged on the doctor's recommendation. The patient's feeling of inferiority was marked and presented a rather difficult problem for adjustment. Treatment steps were as follows:

(1). Lessons with patient in which an attempt was made to put child at ease. At no time was the most serious blunder, as, for example, writing one word for another, noted other than to correct casually. Each new step was taken as slowly as was necessary, so that the work was learned thoroughly before starting anything new. As child's confidence increased, his work showed marked improvement. This confidence showed itself in his voice, which at first had been almost a whisper. He ceased to look questioningly at the examiner when puzzled over a word but went ahead even though errors were made. His mother tells us he looks forward to coming in Saturday mornings, and no longer studies his lessons with nervous dread. Though patient still has to struggle against a difficult handicap, he is now able to keep up fairly well in school.

(2). The father was interviewed and the necessity of patient's associating with boys his own age, taking his knocks, etc., was stressed. Also the significance of parents' attitude was explained in detail, for example, to undervalue his failures in school, to encourage whenever possible, to develop confidence through success in things he knew how to do well.

(3). The mother was interviewed frequently and urged not to shield the patient. Instead of sympathizing in his over-sensitive reaction to the school, to make light of it to permit him to associate with boys of his own age.

(4). Contacts were had with the soccial worker in the district, who interviewed the principal of the school and the teacher, explaining patient's difficulty and the danger of conditioning him through sense of failure.

(5). Correspondence with the teacher, who wrote in detail patient's difficulties in school. Our replies endeavored to enlist her interest in patient, in giving boy individual attention when possible, and to change her point of view through better understanding of him.

Several months later the patient's mother came in to say that both she and her husband felt the patient had definitely improved. He can now keep up fairly well with the class and his teacher takes special interest in him. She herself is trying to overlook his sensitiveness. For example, he recently came home from school with flushed face. On being asked how school went, he said, "Oh, all ight," but a little later she found him sobbing on his bed. Formerly she would have sympathized and indignantly resented the teacher's scolding him but instead, she told him to buck up, and set him to work at something about the house. In all our contacts with patient we have tried to develop confidence through our attitude entirely. In the future we will work in an informal little chat now and then on such subjects as manliness, necessity for being a good sport, etc.

Patient's weekly lessons were interrupted in January by his contracting scarlet fever. After his recovery he again reported to the Clinic, and was advised to have a thorough chest examination and urinalysis. Both of these proved negative. Patient was also given prescription for calcium lactate and cod liver oil. In the spring the family moved to Homestead, where patient is within walking distance of the Homestead library and playground. He has been admitted to St. Mary's Parochial School, and has been promoted from 5-B to 5-A. For several months patient seemed to be keeping up with his class, but in March a report was received that patient had been told that he was demoted to fourth grade. Patient's mental state at this time was a very unhappy one. All of his play time he spends pouring over books, and has developed numerous nervous mannerisms, such as involuntary shaking of the head, and a fidgetiness. His attitude toward school is a hopeless one, and he feels very keenly his handicaps and inability to keep up with the class. His teacher, misunderstanding his oversensitiveness, feels that his failures are due to indifference, and has on several occasions publicly attempted to shame him before the class by calling him dumb and crazy. Because of patient' continually worrying about school matters, and his poor physical condition, which is a result of this worrying, we advised his discontinuing school. Arrangements were made to have patient report for daily lessons to a young college student who, through patience and an understanding of the patient's handicaps and make-up, is attempting again to bring him up to grade. Though illness of a few weeks and two months vacation on a farm have interrupted somewhat these lessons, a remarkable change has been wrought in patient since his leaving school. He not only is very fond of his teacher, but takes great pleasure in his lessons. To quote his parents, "He is an entirely different boy."

It is our plan for the coming winter to have him continue his daily lessons, remaining out of school until

such time as he himself is thoroughly assured of his ability to continue with his classmates.

This ends Miss Wolff's report.

In September of this year, wishing an independent evaluation of the boy's mental status, I requested that he be given a more exhaustive psychometric examination by Mr. M. Bloomberg, who was at that time very kindly doing some special work along that line in connection with the Clinic. His report is as follows:

M. F., Case No. 81.—Throughout this series of tests an effort was made to avoid those involving language, especially reading, due to the defect in this case. Therefore, in the Stanford Scale, the vocabulary tests were omitted.

The patient has an I. Q. of 1.14, with a mental age of 13 7/12, at this date, September 12, 1924, while chronological age is 11 11/12.

Basal years is XII, in year XIV test No. 2, Induction, and No. 4, Problems of Fact were passed, and No. 3, President and King, and No. 5, Arithmetical Reasoning were failed, no others being given. In XVI No. 2, Fables was the only one passed, and in XVIII, no tests were passed.

A number of performance tests were given. On the Goddard Form Board, a ten year score was attained, on the Cube Imitation, a twelve year score, and on the Healy A a fourteen year score. This is a somewhat superior performance for this group of tests, designed to test psychomoter learning. A very interesting learning curve developed in the case of the Healy A, as shown by the accompanying score sheet.

On the Porteus Mazes, a thirteen year score was attained, on the Healy Picture Completion No. 1 a maximal score and on the Healy Picture Completion No. 2 a very superior score.

This, considering the age of the patient, is a very superior performance. This series of tests is grouped under the name of Tests of Practical Judgment.

In general, the patient is above his chronological age level. His practical judgment shows a marked superiority, and it is only in the Goddard Form Board, a matter of manual dexterity, that he falls below his age level.

He was very cooperative throughout the series.

If time permitted I could cite in detail other cases in support of my contention that an isolated defect in the zone of language is not incompatible with average or, as in this case, with superior intellectual attainments in other directions. Bronner reports several cases which subscribe to the same view.

While the problem of the treatment of aphasic children is essentially an educational problem, yet these children cannot be taught in the ordinary school room or by those lacking in understanding of the underlying principles involved.

The aim is to present verbal impressions through every possible sensory approach. In subjects of school age the patient listens to words, looks at words, pronounces words, traces words, all at the same time, thus building up all possible verbal associations. In word-deaf children under school age objects and pictures are substituted for the printed word and the child handles these objects instead of writing the word. Considerable ingenuity is sometimes required to devise a method applicable to the individual child and in the selection of the material to be used, but the results amply repay the effort expended.

Some years ago I advocated reversing the dexterity of the individual by training in the use of the right hand for activities normally performed by the left, as has been advised by Bastion and Sequin in adult aphasia and by Claiborne in juvenile forms, stuttering particularly. I now believe that this is unnecessary in at least the large majority of cases, though it is desirable where an artificial dexterity has been partially acquired to allow the individual to return to his early inclination in this direction. I have seen many instances of language difficulties which appear when a child who was naturally left handed was forced to use his right hand and which difficulties disappeared, when of not too long standing, when reversion to the use of the left hand was allowed.

CONCLUSIONS

(1) Isolated defects and disabilities of varying degree in the zone of language are a frequent cause of interference with the educational progress of the individual and of undesirable affective states leading to serious temperamental, character and behavior difficulties.

(2) In some instances the defect may be so extreme in degree and in its results as to lead to the conviction that the individual is markedly defective in general intelligence unless a careful analysis is made.

(3) Normal and even superior intelligence is not incompatable with marked language difficulties.

(4) Knowledge of the occurrence, prevalence and importance of aphasic conditions in children should prevail more extensively among those coming in contact with children during their early school years in order that these cases may be differentiated from those actually defective in intelligence and that the proper remedial measures may be applied.

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DISCUSSION (Abstract)

Dr. R. M. Van Wart, New Orleans, La.—A comment recently made that there was not an American physician who was capable of diagnosing these cases will no longer hold true, I believe, when the work that Dr. McCeady has done is considered.

Dr. Beverley R. Tucker, Richmond, Va.—This contribution, as Dr. Van Wart says, is the only complete treatise on the subject in the English language, so far as I know. We should all get this paper and read it carefully a number of times and we will be enabled to do a great deal of good in these cases.

Dr. Tom Williams, Washington, D. C.—I want to add another example of a remarkable man, in a family of remarkable men. This was a professor at the Catholic University in Washington, who died recently, and who was regarded by everybody at the University as a genius. He had an astonishing intellect. For some time he could not read at all. Until he was 19 years old he was regarded as an imbecile, until his desire helped him to overcome his condition. The school masters aided him and he began to learn and made himself what he was.

In my family there is a defect of that kind. I did not read until I was 8 but I think that was lack of desire rather than a defect, because when I did learn, inspired by the desire, I learned to read in six weeks. But in my wife's family there is a very definite weakness in spelling, and my boy has the same defect. With reference to that, I think we all meet people who are grossly defective in the power of their perceptions for reading. They read a statement and come away without the slightest notion of its meaning. I wonder if Dr. McCready has not found that true?

On the other hand, we have individuals who cannot get things by hearing them, they forget everything they hear. There is a very remarkable case in this country. a man who is totally without the power of visualization, and yet he is a great scientist, a great anatomist. I asked him how he managed to make the beautiful illustrations of the brain, everything in its proper proportion and relationship, when he could not visualize it. He said "I do it by remembering the directions fore and aft, up and down."

As to the literature on this subject, there is an English writer, Hinshelwood, who used to say that 2 per cent of the average school children were congenitally alexic to some degree. He showed some remarkable cases where children had been utterly incapable of learning at school and who became capable, with much pains, of reading and writing when urged by some great impulse. One little lad became interested in football and learned to read the football news, although it took him four years, beginning by reading placards and newspaper headings and then acquiring very slowly the power of spelling out the football news.

Dr. William Nelson, St. Louis, Mo.—A great many of us can add to the number of cases that are on record of famous men who have had this visual word blindness. There is a prominent educator in Columbia University, New York, who gets his information entirely from having things read to him.

While these cases are rather rare, they do occur, and unless we examine those individuals very carefully, applying all the various tests to them in order to determine the isolated character of their defect, many times they are designated as feeble-minded and they make very poor progress in school. Many of them develop abnormal emotional attitudes towards their problems. It becomes the duty of all of us to impress upon educators that they should never designate an individual as feeble-minded because he does not happen to measure up to the degree of knowledge that a child of a certain chronological age should have. We should caution school teachers, educate them against the attitude of assuming that a child is feeble-minded because he does not make progress in school as it may easily be due to some defect of this sort.

Dr. W. H. Block, New Orleans, La.—I was very much interested to hear what Dr. McCready had to say about the speech in birds and animals. I am firmly convinced that a parrot does not talk simply in repetition, without thought. I am convinced that there is an association of ideas. I had a parrot. When I would go out to look at my garden to see if things were growing, almost every day the telephone would ring several times while I was out there, and the parrot who stayed on the back porch would call "Dr. Block, the telephone." I would not hear the telephone but on going in and answering it I would find there was some one there. He would invariably call me when the telephone rang. He would also call out

about it if the telephone had happened to ring when I was out of the house.

I remember also one evening something that showed a distinct association of ideas, that was not simply a parrotlike language, but something that showed actual thought. Late one evening about 11 o'clock, we had a young lady visiting us and a young man had called upon her. He happened to leave the door open, the wind was blowing in on the parrot and he called to the man "Good night and close the door." That showed a sense of humor as well as an association of ideas.

This parrot and I became very good friends; I learned his ways and he learned mine. The minute he saw me come in and sit down he would perch on my right shoulder and then begin to bite my ear. I knew if I would jerk he would snap me quickly. I would say, "Easy, easy now, easy," and he would bite my ear in a gentle way showing that he understood. Apparently he made up his mind to teach me to talk. That bird stayed in the house with me, ate meals with me, ate off my plate. He would fly in my room in the morning and flap his wings in my face trying to wake me up. I would pretend to be asleep, and after a while would wake up and speak to him. Then he would perch on my table and proceed to give me a lesson in talking. The first note was a simple one and I could repeat it. The second note I got. The third note I could never get correctly, and the parrot knew it. He would look at me with his head on one side, straighten up a little and try it again. I would try it and he would show it was not correct. The parrot would keep that up for a dozen times and then fly off, apparently saying there is no use trying to educate that man, he cannot receive it. That happened day after day, week after week, month after month, and year after year, that the parrot tried to teach me certain notes that I could not understand, and I am satisfied that that parrot had a speech of his own; at any rate, it was very suggestive. We have even now in the world many human being that have very little more speech than animals. There are persons who can only count three; their speech is very limited, they have no adverbs, no conjunctions; they merely recall the names of others. That is a very low form of speech in human beings. I think as we have a limitation of our field of vision so that we can only see the one end of the spectrum, we have also a limitation of our vocal ability. Very few of us can detect the highest note of the piano as a tone. There are certain waves of sound of greater vibration than our ears are able to recognize, and it is more than probable, it seems to me, that we are believing that because our vibrations do not exist among the animals that therefore they have no speech.

I have had this experience: I had two dogs that used to sit in the chair beside me. They would frequently put their heads together and I got in the habit of putting my hands on the dog's throat. There was no apparent movement but I could feel a coarse vibration which must have been a low vibration that was inaudible to my ears. On hundreds of occasions I have put my hands on the dog's throat and could feel a vibration of the throat that I could not hear at all. I do not know what it means but I have frequently had this happen.

Dr. Lydia Poage, Cincinnati, Ohio.—I would like to ask Dr. McCready if he has ever seen a display of emotion by parrots. A relative had a parrot who displayed jealousy.

Dr. McCready (closing).—The discussion has been much more interesting than the paper itself.

As to symptoms of jealousy in parrots, I think Dr. Block can answer that question better than I, as the observations I made were gathered from other sources.

Dr. Block.—Yes, I have noticed symptoms of jealousy in parrots.

THE USE OF OXYGEN BY THE BODY IN HEALTH AND DISEASE*

By G. Canby Robinson, M.D.,
Nashville, Tenn.

The fact that air is necessary for the support of animal life was demonstrated conclusively in 1660 by Robert Boyle, and in 1674, a century before the discovery of oxygen, John Mayo recognized that it is a particular constituent of the air that is necessary for the support of animal life as well as for the burning of a candle. This particular constituent of the air, oxygen, was separated and prepared in pure form in 1774 by Priestley, who recognized it as the substance essential for animal life and for the support of a flame, while at about the same time Lavoisier introduced the conception of respiration and gas exchange as it is understood today. We now know that oxygen is necessary for the functional activity and life of every cell of the human body. With this idea in mind much work has been done relating to the supply and distribution of oxygen in man in health and in disease, and much thought has been given to methods of maintaining the oxygen supply to the human body as a whole, and to its various parts, when the normal mechanisms for this purpose have been disturbed.

Much of the study of the respiratory system, of the circulatory system, and of the blood has centered around this idea. Recently renewed interest in this large question has been aroused by the application of methods which allow accurate measurements of oxygen utilization in health and disease, as is seen especially in the determination of the metabolic rate, and which allow further quantitative analysis of the various functions which combine in maintaining the supply of oxygen to the body. These newer quantitative studies have furnished considerable

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knowledge which has placed the use of oxygen as a therapeutic measure on a more rational and sounder basis. They have also shown its limitations. I wish to review briefly the results of some of the recent studies in which the various functions concerned with the supply of oxygen in health have been accurately measured, and to point out their bearing upon the therapeutic use of oxygen.

It must be borne in mind that the supply of oxygen to the tissues is maintained by three great systems, and that it is perfectly maintained only when there is harmonious "team-work" on the part of all three, namely, the respiration, especially the lungs, where the carriers of oxygen are loaded, the blood, which carries the oxygen, and the circulatory system, consisting of the heart which propels the carriers, the arteries, which convey the carriers, and the capillaries, in which the carriers are unloaded of the amount of oxygen needed by the particular part of the body through which the blood is flowing.

It is, after all, the amount of oxygen reaching the various parts of the body by way of the capillaries in a unit of time, and the amount the tissues can withdraw from a unit of blood that determines the oxygen supply to the tissues. It is the maintenance of an adequate oxygen supply to the tissues which is one of the great problems that is faced by the physician in many diseases. It is an inadequate supply of oxygen to the tissues which is the primary cause of many symptoms of disease. Either an increase of the supply of oxygen, or a restriction of the need for oxygen is the therapeutic demand in many instances, as occurs for instance in pneumonia and pulmonary embolism, in various forms of heart disease and in anemia from any cause. It has been found that in a normal individual 100 c. c. of blood carries from the lungs approximately 20 c. c. of oxygen, and that at rest on an average of 25 per cent of this oxygen is taken out of the blood in the capillaries, the remaining 75 per cent constituting a reserve which is called upon when bodily exercise or other functional acitivity makes a greater demand.

In other words, about 95 per cent of the hemoglobin leaves the lungs as oxyhemoglobin and about 70 per cent returns to the lungs as oxyhemoglobin. Five per cent of the hemoglobin is not oxydized in the lungs, and appears in the arteries as reduced hemoglobin, while the venous blood of a resting normal person contains on an average about 30 per cent of reduced hemoglobin. Measurements of the amount of

TABLE I

Subject	O_2 consumption per minute c. c.	O_2 utilization volumes per cent	Minute output c. c.
1. A.	231	6.53	3520
2. H. (1)	231	6.05	3820
3. R. (1)	236	5.97	3950
4. R. (2)	238	6.01	3960
5. H. (2)	230	5.59	4120
6. G. Q.	192	4.28	4480
7. L.	235	5.25	4480
8. M.	249	5.47	4550
9. B. (1)	208	4.55	4540
10. P.	240	5.16	4650
11. K.	245	4.09	6000
12. B. (2)	213	3.14	6780
Range	192-249	6.53-3.14	3520-6780

Table I.—Observations on oxygen consumption, oxygen utilization and the minute output of the heart in nine resting adults.

oxygen withdrawn from the blood have been made by C. S. Burwell and me, and the results of twelve observations on normal resting adults are given in Table 1. I wish to direct your attention first to the third column in which is given the actual amounts of oxygen withdrawn from each hundred cubic centimeters of blood as it passed through the body. These figures were obtained by subtracting the amount of oxygen in the blood returning to the lungs from the amount found in the arterial blood. The arterial oxygen was determined by an analysis of blood obtained by arterial puncture. The oxygen of the blood returning to the lungs, the so-called mixed venous blood, was determined by a method which we have devised, and which has recently been published.[1] These observations were made on healthy subjects at complete rest, twelve to fifteen hours after taking food, when the subjects were in the so-called basal state.

The amount of oxygen absorbed by the body per minute is shown in column 2. These figures were obtained under the same conditions by analysis of the expired air by the Tissot method. As the amount of oxygen taken from each hundred cubic centimeters of blood, and the total amount of oxygen absorbed per minute are known, it is possible to calculate the amount of blood which has passed through the lungs each minute, and so determine the amount of blood put out by the heart each minute. These calculations are shown in column 4. It is seen in column 2 that there is no great variation in the total amount of oxygen absorbed per minute in this series of twelve observations on nine healthy adults. It is seen in column 3 however, that there is a definite difference in the amount of oxygen utilized, the variation being from 6.53 to 3.14 volumes per cent. In observation No. 1, 31 per cent of the total oxygen in the arterial blood was withdrawn by the tissues, while in observation No. 12 only 14 per

TABLE II

Subject	O_2 Consumption per minute	O_2 Utilization volumes per cent	Minute Output	Heart Rate	Output per beat
		Volumes			
I.	c. c.	per cent	c. c.		c. c.
R. (1) Basal	236	5.91	3940	66	60
R. (2) Basal	236	5.97	3950	68	58
R. (3) Basal	238	6.01	3960	72	55
R. (4) Slight Exertion	331*	5.13	6450	92	70
R. (5) Slight Exertion	331*	5.40	6130	90	68
R. (6) Exercise	960	9.40	10200	108	94
II.					
B. (1) Basal	213	3.14	6780	66	103
B. (2) Basal	208	4.58	4540	62	73
B. (3) Basal	220	4.12	5340	64	83
B. (4) Slight Exertion	291	3.05	9540	92	104
B. (5) Exercise	857	7.30	11750	104	113
B. (6) Exercise	816	7.44	10970	100	110

*Average of six determinations.

Table II.—Observations on the oxygen consumption, oxygen utilization and the behavior of the heart in two subjects during rest and during slight exertion and exercise.

cent was withdrawn. The total oxygen absorbed in the two individuals, Nos. 1 and 12, was nearly the same, so that there must have been a much greater blood flow in subject No. 12 than in subject No. 1, as the figures show.

These figures indicate the mechanism by which oxygen is supplied to the body in healthy adults at complete rest.

The reaction of the body to exercise in regard to the oxygen supply is shown in Table II. Data obtained from the study of two individuals at rest and during slight and moderate exercise are given. The amount of the exertion may be measured by the total oxygen consumption per minute, as shown in column 2. The increase in the amount of oxygen utilized from each hundred cubic centimeters of blood is seen in column 3. The increase in the amount of blood put out by the heart is shown in column 4, while columns 5 and 6 show the manner by which the heart met the extra call upon it for a greater blood supply. In both subjects there is a well marked acceleration of heart rate. In subject 1 the output of the heart per beat was augmented, while in subject 2 there was very little augmentation above the largest resting output of the heart per beat.

This table shows clearly that the call of the body is met in two ways. First, with a slight exertion the increased number of heart beats can alone supply the needed oxygen by increasing the amount of blood thrown into circulation each minute, and this is accomplished with little or no augmentation of the cardiac output per beat. There is also a slightly diminished amount of oxygen utilized from each hundred cubic centimeters of blood. When, however, the oxygen consumption per minute is increased nearly three times by exercise, it is seen that there is not only a great increase in blood flow but there is also a striking increase in the amount of oxygen withdrawn from each hundred cubic centimeters of blood. There are, therefore, three factors which participate in augmenting the supply of oxygen per minute, namely, an increased withdrawal of oxygen from each unit of blood, an increase in the number of heart beats per minute, and an increase in the amount of blood discharged by the heart with each contraction. The third factor is apparently more prominent in some individuals, as in subject 1, than it is in other individuals, as in subject 2.

It is necessary, therefore, in order that the oxygen supply shall meet the demands of the body under conditions of exercise that the blood should be well oxydized in the lungs, that the heart should be capable of augmenting its rate and at least in some individuals, that it should be also able to increase its output per beat. It is also necessary that the oxygen carrying function of the blood should not be seriously reduced.

There are many types of disease when one or more of these factors which participate in regulating the oxygen supply are damaged. It must also be borne in mind that the oxygen requirements are increased in many diseases, especially whenever there is fever. They are also increased when the thyroid is over-active. These facts are responsible in part, perhaps largely responsible, for the importance of rest in treating many types of illness, as by rest the oxygen requirements of the body are reduced.

Cyanosis and rapid, shallow breathing are two important signs of deficient oxygen supply. A study of cyanosis has been made by Lunsgaard and Van Slyke,[2] and its relation to oxygen deficiency has been determined by careful measurements of oxygen in the blood. They have found that it is the absolute amount of reduced hemoglobin in the superficial capillaries, especially of the lips, mucous membranes and nail beds, that gives the bluish color to these parts that we call cyanosis. According to Lunsgaard and Van Slyke, cyanosis occurs when there is on an average of 13 volumes per cent of reduced hemoglobin in the venous blood, or, when 65 per cent of the hemoglobin present in the blood of a non-anemic person is present as reduced hemoglobin.

The question then presents itself, is cyanosis an indication for the therapeutic use of oxygen? This question can only be answered after an inquiry into the cause of the cyanosis. Generally speaking, there are two main causes of cyanosis: first, imperfect oxygenation of the blood in the lungs, such as occurs in pneumonia, emphysema, and congenital heart disease, which allows only part of the blood from the right heart to pass through the lungs; and, secondly, increased withdrawal of oxygen from the blood in the capillaries, as occurs when the capillary circulation is abnormally slow because of an inefficient heart. An inadequate supply of oxygen due to severe anemia will not cause cyanosis, as even with almost complete reduction of the hemoglobin in the periphery, there is not enough reduced hemoglobin to give the characteristic bluish color.

The administration of oxygen is of no avail in congenital heart disease, nor is it indicated by cyanosis of cardiac origin when the lungs are comparatively clear. The chronic cyanosis of emphysema can also only be temporarily relieved by oxygen. It is in the acute failure of the lungs to furnish the blood with an adequate supply of oxygen in which oxygen administration is especially called for. The presence of anemia, or of heart failure emphasizes the importance of adequate ventilation of the blood, and it is the combination of acute pulmonary failure that takes place in pneumonia and pulmonary embolism, together with inadequate ability for compensation by the heart and blood that call especially for the therapeutic use of oxygen. Oxygen may be also of service when heart failure occurs in patients with chronic emphysema.

The use of oxygen in pneumonia is generally recognized. In an experimental study of pulmonary embolism by Binger, Brow and Branch,[3] it was found that the blood left the lungs in a state of partial oxydation, causing an anoxemia, which they have attributed to a change in the quantitative relation of blood flow to the vascular diffusion area in the lungs. They consider that the nature of this changed relationship is two-fold: (A) An increased rate of flow through the capillaries, the flow being so rapid that the blood cannot assume its normal load of oxygen; and (B) a compensatory dilation of the capillaries which are crowded with corpuscles in columns so thick as to interfere with the normal inward diffusion of oxygen. They say that each of these defects in oxygen diffusion can be remedied by raising the oxygen tension in the alveoli of the lungs.

The purpose of administering oxygen is to raise its tension or pressure in the lung alveoli. This is done very slightly and inadequately as well as wastefully by liberating oxygen over the patient's face. Oxygen must be actually introduced into the upper air passages. The ideal method of administering oxygen is by means of the oxygen chamber, which is not, however, within the reach of the practitioner. Another method which requires a simple apparatus, is that described by Barach and Woodwell,[4] in which the patient rebreathes from a rubber bag filled with oxygen, to which he is attached by a gas mask. The expired carbon dioxid is removed by means of soda lime between the bag and the mask. Probably the simplest adequate method of oxygen administration is accomplished by means of a nasal catheter, held in place by adhesive plaster, into which oxygen is forced from a cylinder. The supply of oxygen is regulated by bubbling it through a bottle of water, two or three bubbles a second being allowed to pass through the water and into the catheter. Means,[5] who has studied the effect of oxygen administration thoroughly, has recently written: "Of the agents which may be used to promote gas exchange in the lungs by far the most important is oxygen. This gas as a therapeutic agent is of great value. Its relatively infrequent use in clinics today is doubtless due to the lack of satisfactory modes of administration." He says further that practically all anoxemia due to faulty oxygenation in the lungs, except congenital heart disease, will be improved or abolished by oxygen therapy. The anoxemia of pneumonia is nearly always relieved by oxygen, as well as that of heart disease when there is a lack of oxygen in the blood because of pulmonary causes, such as edema of the lungs.

Let me emphasize in closing that it is not the spasmodic use of oxygen that is of value. The gas should be administered over hours or days, and when properly arranged, need not interrupt sleep. Its rational use should be encouraged, as it tends to combat one of the fundamental causes of death, and when properly administered in suitable cases, it may relieve distressing symptoms.

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DISCUSSION (Abstract)

Dr. W. E. Garrey, New Orleans, La.—I wish to refer very briefly to some actual reasons for the need of oxygen which we are prone to overlook in the blanket statement that we need oxygen to supply energy. Thus oxygen is essential to synthetic processes within the cells themselves. We all know that the upbuilding of the various tissues can take place only in the presence of oxygen. We are further familiar with Pasteur's finding that certain toxins are readily disposed of in the presence of oxygen but retain their toxic properties when there is a lack of oxygen. This has a direct application upon some of the facts which Dr. Robinson has presented. Most of the conditions of lack of oxygen are due not merely to lack of oxygen *per se*, but to undestroyed toxic substances which ultimately lead to a definite deterioration of the various organs whose function is essential to the delivery of oxygen to the tissues. For instance, toxic effects upon the respiratory center interfere with lung ventilation upon which the absorption of oxygen depends. Again, they will interfere with blood-forming organs, the blood corpuscles, the heart and the blood vessels so essential for the transport of oxygen.

Obviously a primary factor in supplying oxygen to the tissues is an adequate supply of hemoglobin, but lacking this, as often happens, the only possible compensating mechanism is the circulatory one. Dr. Robinson presented one case in which the circulatory efficiency was multiplied by five.

He also brought out points bearing on a physiological controversy, namely, whether this increase in circulatory efficiency is due to an increase in the amount of blood discharged per heart beat or is a function of the cardiac rate. Both types of cases were shown. It would seem then that it depends upon the idiosyncrasies of the individual and upon the conditions under which he is working.

Dr. J. E. Paullin, Atlanta, Ga.—As stated by him one type which is due to a deficiency in the ventilating system of the lung is the so-called anoxic type; another the stagnant type in which the anoxemia is due to a deficiency in the propelling power of the heart in that it is unable to drive the blood through the lung with sufficient force to aerate completely, and the third type occurring in certain anemic individuals with a very low hemoglobin percentage, as shown by Dr. Garrey.

The interesting contribution which Dr. Robinson has made is the fact that in certain types of oxygen deprivation the condition can be greatly relieved or benefited by the administration of oxygen. In the first type of case, such as is represented by the edema of the lungs, pneumonia or thrombosis of the pulmonary artery, the administration of oxygen is of considerable value in that we are enabled by increasing the tension of the oxygen in the inspired air to bring the percentage of the blood very nearly up to its normal 95 per cent mark. In the second type of anoxemia, that is that due to a stagnation of the blood in the ventilating system, the administration of oxygen is of very little value unless the condition is acute. In the chronic condition the hope of improvement rests in our ability to increase the force of the heart beat.

The essayist has also directed our attention to the fact that the administration of oxygen as commonly employed is of no value. The value of oxygen inhalations is obtained only when the inspired air contains a higher percentage of this gas than atmospheric air, and the method of administration per catheter placed in the nose is of a great deal of value and the only simple method with which I am acquainted that can be used universally.

STUDIES OF THE AGGLUTINATION OF THE PROTEUS GROUP OF BACILLI BY HUMAN SERA*†

By H. M. WEETER
and
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The proteus group of bacilli has been described as the cause of various pathologic conditions. They have been isolated from suppurative processes such as brain abscesses, peritonitis, empyema; from cases of infantile diarrhea; from outbreaks of food poisoning and from normal stools. Recently a certain strain designated Proteus X 19,[1] obtained from the urine of a typhus case, has been found of diagnostic value because of non-specific agglutination with the blood sera of persons suffering from typhus fever.

In the present work we endeavored to determine the extent to which non-typhus human sera would agglutinate certain cultures of the proteus group, including a culture of Proteus X 19 used in the diagnosis of typhus fever.

The sera were obtained from the patients on whom routine Wassermanns were run at the Louisville City Hospital. They comprised surgical, medical, psychopathic, prenatal and other dispensary cases. The cultures used were: a culture of Proteus vulgaris received from the University of Chicago; Proteus mirabilis from Yale University; Proteus X 19 from the Hygienic Laboratory and a culture of Proteus X 19 from the New York City Board of Health. Saline suspensions of freshly grown agar cultures were used.

Routine tests were run in dilutions of 1/10 and 1/50. Preliminary readings were taken after two hours in the incubator and final readings after 12 to 15 hours in the ice box. When the 1/50 dilutions showed complete agglutina-

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TABLE 1
AGGLUTINATION OF PROTEUS X 19 BY NORMAL HUMAN SERA

Serum No.	2 hrs. 37° C.					Overnight ice box				
Dilution	10	50	100	200	400	10	50	100	200	400
124-15	No record					C	3+	2+	—	—
124-18	No record					C	C	C	O	—
126-48	No record					C	C	2+	O	—
916-27	C	2+	+	—	....	C	3+	+	—	—
916-41	C	+	tr.	—	....	C	3+	+	—	—
920-35	C	3+	2+	tr.	....	C	C	C	3+	—
923-6	3+	2+	O	O	....	C	C	2+	O	—
925-7	2+	O	O	O	....	C	3+	+	O	—
925-12	2+	O	O	O	....	C	3+	+	O	—
925-15	C	O	O	O	....	C	C	3+	O	—
916-5	C	C	3+	—	....	C	C	C	O	—
1011-17	3+	2+	O	O	....	C	C	C	O	—
1023-15	C	C	tr.	—	....	C	C	2+	O	—
1023-22	C	2+	O	O	....	C	C	3+	+	—
1023-29	C	O	O	O	....	C	C	+	O	—
111-1	C	O	O	O	....	C	C	+	O	—
1021-G	C	C	3+	3+	....	C	C	C	C	O
1021-19	C	+	O	O	....	C	2+	+	O	—
1028-44	C	+	O	O	....	C	C	2+	O	—
114-5	C	+	—	—	....	C	C	2+	O	—
114-11	C	O	—	—	....	C	C	+	O	—
116-35	C	O	—	—	....	C	C	2+	O	—
116-47	C	O	—	—	....	C	C	2+	O	—
1111-6	C	C	—	—	....	C	C	+	O	—
1111-18	C	C	—	—	....	C	C	2+	O	—
1111-21	C	C	—	—	....	C	C	+	O	—

C=Complete agglutination.
+ to 3+=slight to almost complete clumping.
Tr.=trace.
O=negative.
—=no test.

tion in the final readings, the sera were tested in higher dilutions.

Eight hundred and fourteen sera were tested against Proteus X 19 from the Hygienic Laboratory. Eighty-two of these were tested against the culture received from the New York City Board of Health, but as the results were in fairly close agreement, they are reported only for the former culture.

Three hundred and one sera, or 37 per cent, showed recognizable clumping after two hours in 1/10 dilution, and 268 sera, or 35 per cent, gave complete agglutination at the final reading in this dilution. Two hundred and four sera produced a partial clumping in the 1/50 dilution at the final reading and 41, or approximately 5 per cent, produced complete agglutination in the 1/50 dilution.

Practically all in which agglutination was complete at the final reading showed some evidence of agglutination at the preliminary reading.

Twenty-six of the 814 sera tested gave agglutination in 1/100 dilution, 5 resulting in complete sedimentation; and 3 sera agglutinated Proteus X 19 in 1/200 dilution, one being complete, one a 3+ reading and one a 1+ reading.

In their description of the technic of the reaction as applied to typhus fever, Weil and Felix[1] state that the titre should rise from 1/25 on the sixth day to 1/200 or higher on the twelfth day; and that if the titre does not rise above 1/25, typhus fever usually may be excluded. In 632 control sera which they tested, 12 per cent were positive in a 1/25 dilution, but these reactions were delayed or incomplete.

Fairley[2] states that he never obtained agglutination with the blood of non-typhus cases in 1/20 dilution in all of his tests.

Our results show 41 sera or 5 per cent of the number tested agglutinating Proteus X 19 in a 1/50 dilution; 26 agglutinating partially and 5 completely in a 1/100 dilution, and 3 agglutinating Proteus X 19 in a 1/200 dilution, two of these being fairly strong reactions in sera which showed early clumping in the lower dilutions. The extent to which the sera agglutinating Proteus X 19 above 1/50 dilutions produced early clumping is shown in Table 1.

A possible explanation of these results is that their cultures probably were recently isolated and ours were carried longer as laboratory strains, freshly isolated cultures frequently failing to agglutinate as well as older strains.

An attempt was made to isolate proteus organisms from feces and urine of the individauls giving positive reactions with Proteus X 19. From 17 of these patients we secured 10 different specimens of feces and 10 of urine. Portions of these were inoculated into 3 per cent peptone broth. After five to seven days' incubation inoculations from the broth were made into the water of condensation of plain agar slants. Bacterial growths spreading upward over the slant were tested for the characteristics of the proteus

group. Direct planting of feces and urines were tried also, but preliminary enrichment in peptone broth gave positive results at times when direct planting failed.

From six of the feces and three of the urines representing nine individuals, we obtained proteus cultures, all of them differing from Proteus X 19 in rapidly liquefying gelatin. One of these was from a fecal specimen from the case giving highest agglutination with Proteus X 19. Tested against an immune serum for Proteus X 19 having a titre of 1/6400, it failed to agglutinate completely in 1/10 dilution.

The patient in question had osteomyelitis of the tibia of two and one-half years' standing following an automobile accident. Two different culturings of this lesion yielded a pure culture of Bacillus pyocyaneus which was agglutinated by the patient's serum in 1/10 dilution, but in none higher.

AGGLUTINATION OF PROTEUS VULGARIS AND PROTEUS MIRABILIS

Agglutination of proteus strains from infectious processes by the sera of the patients has been noted by several workers. Two hundred and twenty-seven of the sera that were tested against Proteus X 19 and that came from persons with no positive history of proteus infections, were tested against a strain of Proteus vulgaris and 73 were tested also against Proteus mirabilis. Thirty-seven, or 12 per cent, agglutinated Proteus vulgaris completely in 1/10 dilution; 5, or 2.2 per cent, completely in 1/50 dilution, and 3, or 1.3 per cent, in a 1/100 dilution. Of the 73 sera tested against Proteus mirabilis, 16, or 22 per cent, agglutinated this organism completely in a 1/10 dilution; and 4, or 6 per cent, only partially in a 1/50 dilution.

Of the three strains tested, Proteus X 19, Proteus vulgaris and Proteus mirabilis, Proteus X 19 was agglutinated much more readily both in 1/10 and in 1/50 dilutions than either of the other two cultures.

SUMMARY AND CONCLUSIONS

Human sera from the patients with no known history of proteus infections, agglutinated Proteus X 19 both early and completely in dilutions which have been described by previous workers as indicative of typhus fever in the early stages.

The highest dilution recorded giving positive agglutination with normal serum was 1/200.

Proteus bacilli were isolated from 6 of 10 specimens of stools and 3 of 10 specimens of urine from 17 different patients whose sera agglutinated Proteus X 19 in higher dilutions. These differed from Proteus X 19 in gelatin liquefaction and in their behavior toward Proteus X 19 immune serum.

A culture of Proteus vulgaris and one of Proteus mirabilis were not agglutinated so readily or in such high dilutions by certain of the above sera as was Proteus X 19.

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DISCUSSION (Abstract)

Dr. Kenneth M. Lynch, Dallas, Tex.—As I understand the practical points of this work it has been shown that a certain per cent of normal sera agglutinates the organism which is used in the agglutination test in typhus fever. That has not been shown previously, I believe. On further proof of this point will depend the usefulness of this reaction, since even a small per cent of error would necessarily throw considerable doubt upon its value. We have believed heretofore that it is in no way specific and that it has no etiological relationship to typhus fever. It will be of interest to determine whether freshly isolated cultures of proteus bacilli may be reliable in the test whereas long grown laboratory cultures may not be reliable.

I was interested to note the appearance of proteus bacilli in the urine of some of the patients who gave the agglutination in fairly high dilution. What the substance is which causes the agglutination is, I suppose, uncertain in nature, but may not there be in typhus fever a production of agglutins against a variety of organisms, and wou'd not there be some question of the Plotz bacillus in this connection?

Dr. G. E. Davis, Mobile, Ala.—During the last year in Alabama, we have had a number of cases that have been typical, clinically, and have given agglutination with X19 in a serum dilution of 1/2000. In the summer, when a blood came to the laboratory for a Widal reaction, we set up the serum with the typhoid bacillus, Para A and B, and X19. In several instances we found that in a serum dilution of 1/40 and 1/80 all four organisms agglutinated, but with higher dilutions (macroscopic) we were able to rule out three out of four of the organisms. It was stated at the Southern Public Health Laboratory Association meeting in Mobile, last spring, that with a serum dilution of 1/100 no nonspecific reactions were obtained with X19.

Dr. Weeter (closing).—I am not trying to prove the Weil-Felix reaction unreliable, merely to show that dilutions of 1/50 and possibly 1/100 as used in early stages of suspected typhus are too low.

BASOPHILIC LEUKOCYTOSIS IN EXPERIMENTAL SYPHILIS OF THE RABBIT*

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and
W. K. GRIGG,
Albany, N. Y.

Basophilic leukocytosis is seen so uncommonly that the following observations, which present unusual instances of the condition, appear worthy of record. Myelogenous leukemia may be said to be the one disease in which basophilic increase occurs in the blood of man. The basophil of the rabbit appears on the contrary to be forced into the circulating blood rather easily by appropriate stimuli. More or less marked increase has been reported in this animal following the administration of various substances, most of which have been distinctly hemotoxic. Levaditi[1] recorded basophil counts of 10 to 13 per cent in rabbits and guinea pigs following the subcutaneous injection of bacterial toxins and the intraperitoneal injection of a specific hemolysin. Proscher[2] noted increase in the rabbit after injection of a hemolytic poison, "phrynolysin." He also noted counts of 16 to 18 per cent after injection of supposed cultures of an ultramicroscopic "smallpox virus." Pappenheim and Szecsi[3] produced a basophilic leukocytosis in rabbits by the injection of saponin. Bunting[4] in his well known work on experimental anemia in the rabbit observed increased numbers of basophils in ricin anemia. Weiskotten and Steensland[5] record basophil increase in late benzol poisoning in the rabbit. The highest counts that have been encountered in the literature are those of Schlecht[6]. In guinea pigs dying after repeated intraperitoneal injections of horse or sheep serum he observed increase in the basophils reaching levels of 25 to 28 per cent of the total leukocytes. In the work here reported we have encountered even higher percentages.

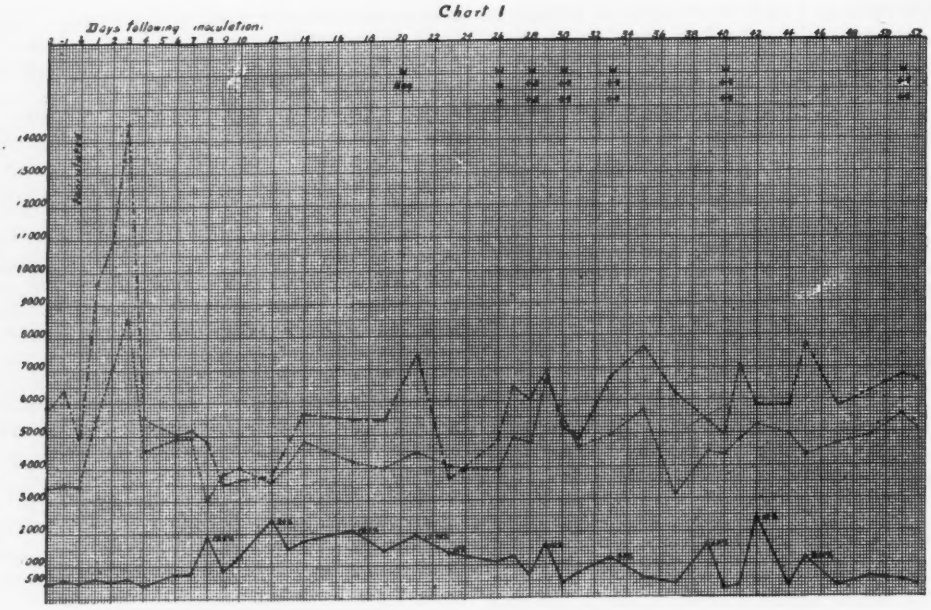
The present findings developed as the result of cytologic examinations of the blood carried on merely as one phase of a study of experimental syphilis in the rabbit.[7] This animal is of course notorious for its hematologic instability. Every effort was made to stabilize the white count in our animals by feeding at stated intervals and by collecting specimens at approximately the same time each day. Despite all precaution we did however encounter many fluctuations in total and differential counts. Wide oscillations of the leukocytes occurred without apparent reason. The variation in the white count amounted in some cases to as much as 100 per cent on successive days without the appearance of any clinical phenomena to explain such abrupt changes. Our difficulties were increased by the fact that the main problem as originally outlined involved the application of the x-ray to the animals, so that many of those worked on had been exposed to an agent capable in itself of exciting marked disturbance of the blood forming tissues. Finally, the entire study was unexpectedly interrupted before sufficient control work could be done. The present paper states a problem but can not provide the final answer to it.

Total counts were made in the usual way on blood collected from the ear vein. Films for differential counting were made by the cover slip method to secure even distribution of the cells. They were stained by the benzidinthionin method previously described by one of us.[8] By this method the basophils are prominently stained and there is no danger of washing out the water-soluble gamma granule. The method usually gives a slightly higher basophil count than does the Wright stain. Inoculation of the rabbits was carried out by introducing into each testicle 0.5 c.c. of a fresh emulsion prepared from the testicle of an animal showing active syphilitic orchitis. The source of energy used in the x-ray treatments was a large water-cooled Coolidge tube. It was operated at a voltage of 50 kilovolts and a milliamperage of 50. The animal was held at a constant distance of 15 centimeters from the target.

In the 7 animals making up the first series of rabbits that were inoculated, blood counts were made at intervals of two to four days. It was noted that the differentials showed occasional sharp basophilic increases. Two of the 7 animals were adult females. They were inoculated intravenously and one received also an intraperitoneal implantation of a small mass of the testicular substance. As is usual, both failed to show any recognizable lesions. Nor did either show any basophil increase. Among the five males, all of whom showed active lesions, basophil counts of from 11.7 to 20 per cent were observed in three animals.

Following up the suggestion that basophilic increase may accompany treponema infection

*Read in Section on Pathology, Southern Medical Association, Eighteenth Annual Meeting, New Orleans, La., Nov. 24-27, 1924.



in the rabbit, a systematic effort was made to follow the course of the leukocytes in all animals of the second series inoculated. There were 11 animals, all males. Four had been given x-ray exposure of 40 milliampere minutes 24 hours before inoculation, four had received 70 milliampere minutes and three were inoculated without previous raying. One non-rayed animal and all four that had received the heavy dose of 70 milliampere minutes died before the development of lesions. One of the latter group survived 24 days, another 20 days. Six animals survived and all showed typical lesions. The following charts present the blood findings in these six animals as well as in one of the heavily rayed animals. The graphs represent polymorphonuclear cells (broken line); lymphocytes (dotted line), and basophils (solid line). The total number of cells per cubic millimeter of blood is plotted in each case. Notable percentage figures of the differential counts are written in at some places on the basophil line.

Chart 1 is that of a non-rayed rabbit inoculated in each testicle with 0.5 c.c. of a fresh emulsion containing active spirochetes. The same emulsion and dosage were used for all other animals of the series. Following inoculation there was a sharp rise in the polymorphonuclears and lymphocytes with prompt return to normal. By the eighth day the basophils had risen from an initial level of 415 per cubic millimeter (5 per cent in the differential count) to 1903 per cubic millimeter (19.4 per cent). On the twelfth day they totaled 2304 (24 per cent) while the pseudo-acidophils and lymphocytes remained practically stationary. There was a gradual fall in the total and relative numbers during the next two weeks with a normal count at about the time of the appearance of a four-plus Wassermann reaction in the serum. There is a slight secondary rise of short duration with a sudden peak of 17 per cent in relative numbers on the fortieth day. The count then returned to normal.

Chart 2 shows a similar reaction in the second non-rayed animal. The first notable elevation in the basophil line occurred on the tenth day, when the other leucocytes were falling. On the twelfth day there were 2261 (19 per cent) basophils and on the fifteenth day, 3465 (27.5 per cent). After a drop to 16 and 14 per cent, they rose again to 27.5 per cent on the nineteenth day. There was then, as in the first animal, an iregular fall, with high normal values at the beginning of the Wassermann-positive period at about the twenty-sixth day, when, after a brief rise to 11 and 10.75 per cent on the twenty-eighth and twenty-ninth days, there was a return to normal.

Chart 3 is that of a rabbit inoculated 24 hours after an x-ray exposure of 40 milliampere minutes. On the day of inoculation there was a characteristic fall in the number of lymphocytes with slower decline of the polymorphonuclears. The post-inoculation rise of the two previous charts was replaced by an x-ray leucopenia. The relative number of the basophils was normal until the fifth day when they rose to 11.6 per cent. On the sixth day they made up 15 per cent of the total leukocytes, on the tenth day, 20 per cent, and on the twelfth day, 35 per cent. At this time their absolute number was 2246 per cubic millimeter of blood while the lymphocytes totaled 1728 (27 per

cent) and the pseudo-acidophils 2304 (36 per cent). There were 1 per cent each of endothelial leukocytes and eosinophils. A second peak of 25.3 per cent on the fifteenth and 20.5 per cent on the sixteenth day was followed by a decline to normal at about the twenty-sixth day. There was again a second irregular rise following the appearance of the positive serological reaction. The relative numbers were here but slightly increased, but the sharp elevation in the total leukocyte count carried the basophil totals to figures of 1815 and 1720 per cubic millimeter.

Chart 4 is that of another rabbit that was inoculated 24 hours after an x-ray exposure of 40 milliampere minutes. On the fifth day the basophils rose to 15.4 per cent while the other leukocytes were still at abnormally low levels. They registered 12.5 per cent on the tenth day and rose to an abrupt peak on the sixteenth day. At this time there were 9800 total leukocytes of which 2450 (25 per cent) were lymphocytes and 2842 (29 per cent) basophils. The total number fell to 1400 and 1463 on the seventeenth and nineteenth days and on the twentieth to 468 (4 per cent). There was no second elevation accompanying the serologic and local anatomic manifestations. The four-plus Wassermann reaction in this animal was somewhat delayed in its appearance.

Chart 5 is that of a rayed animal in which the findings were atypical. Despite an x-ray exposure of 40 milliampere minutes the leukocytes showed only a moderate and transient decrease. Fluctuations in the leukocyte counts were more prominent than usual. Of particular interest was the course of the basophils. These cells never rose above the normal in absolute or relative numbers. The highest figure recorded (8.5 per cent) was noted on the ninth day. The Wassermann reaction in the blood serum never came to the complete four plus stage, while the anatomic lesions were sluggish in their development and involved the superficial and deep scrotal tissues rather than the testis itself.

The rabbit of Chart 6 again illustrates a failure in the basophilic reaction in an animal showing minimal anatomic and serologic evidences of infection. There was never a well developed orchitis although a sluggish chancre developed late (at about the fortieth day) and scrapings from its margins on the forty-fifth day showed large numbers of spirochetes. The serological reaction was delayed and weak. The leukocytes failed during a long period to recover from the initial drop that followed x-ray treatment. The basophils were persistently low. The highest level was reached on the twelfth day when the relative number was 8 per cent and the total, 496 per cubic millimeter.

Chart 7 is that of an animal inoculated after having had an exposure of 70 milliampere minutes. It is included as showing essentially the same basophilic change as that observed in the above animals. Despite the persistent leukopenia resulting from the heavy raying, basophils appeared in relative numbers comparable with those already noted, while the rise coincided also in point of time. The terminal polymorphonuclear leukocytosis was explained by a massive bronchopneumonia that caused the animal's death.

Since the basophils followed essentially the same course in non-rayed and in rayed animals, these findings led us to the hypothesis that the spirochetal infection was the condition determining the basophilic increase and that the degree of this increase directly paral-

Chart 2

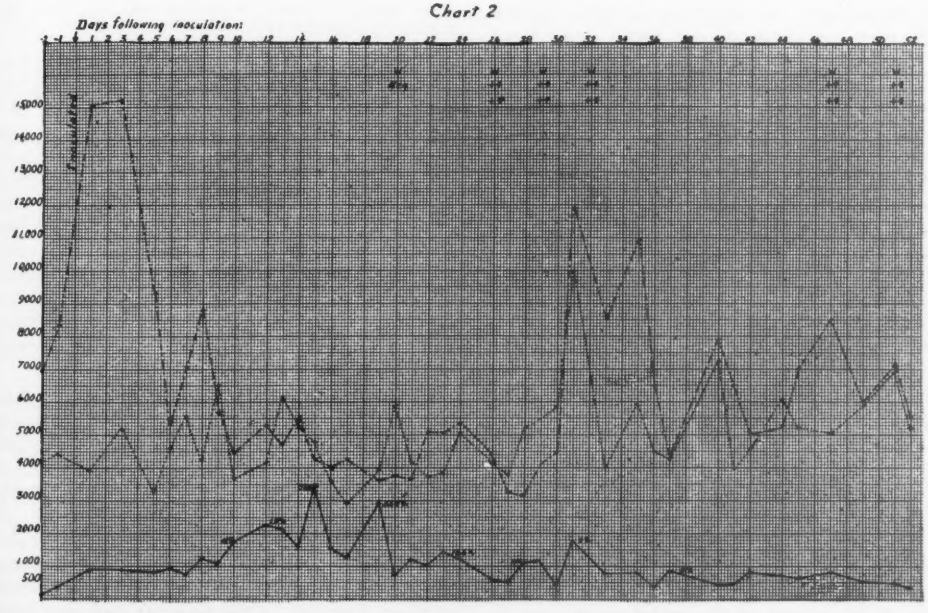
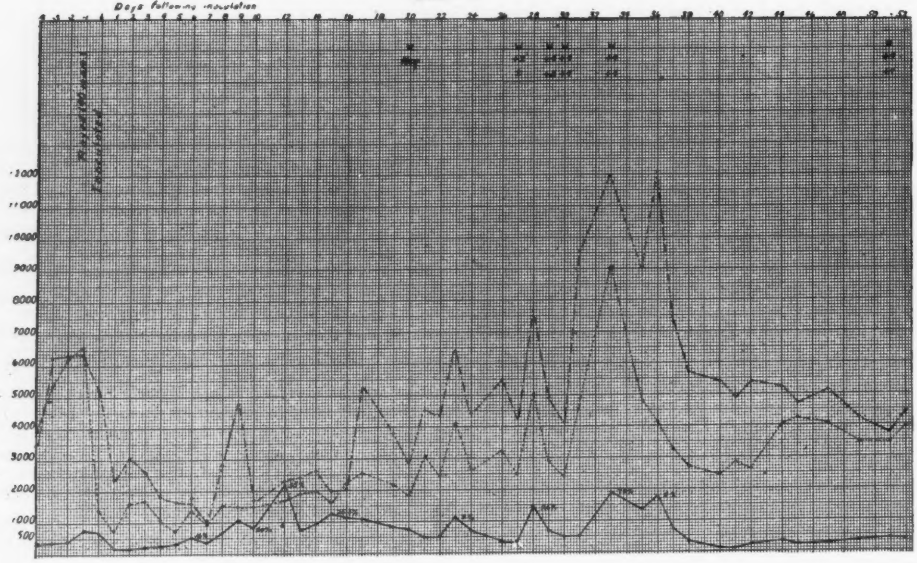


Chart 3



leled the severity of the infection. Other burdens prevented the continuance of routine blood counts on the scale here attempted but in the animals of subsequent series control counts were made as often as possible particularly during the periods that had appeared critical. In the third series of 17 animals occasional counts were made in nine. Seven of these were adult females. Low counts were obtained consistently in five of these seven. One of the five was a normal control, non-rayed and non-inoculated; one had been inoculated without raying; one had been rayed but was not inoculated; and two had been inoculated after raying. Two females gave basophilic increases. Both had been inoculated after raying. One showed a maximum count of 16 per cent, the other a maximum of 14 per cent. One of the males died on the fifth day, the other on the seventeenth day. The latter showed a basophil count of 18 per cent on the tenth day.

In the fourth series no counts could be made. Occasional counts were made on 8 of the 16 animals making up the fifth series.

One of these was given an exposure of 40 milliampere minutes and inoculated 48 hours later. On the third day there was 3 per cent of basophils; on the seventh day, 15 per cent and on the eleventh day, 39 per cent. At this time the total leukocytes numbered 4900 and there was 45.5 per cent lymphocytes and 15.5 per cent pseudo-acidophils. The basophils made up 27 per cent of the total leukocytes on the thirteenth day and 25 per cent on the fourteenth day. The animal died on the nineteenth day of acute generalized peritonitis. There was no evidence of local inflammation of the testes or scrotum. There was, however, an acute enteritis and the peritoneal exudate contained the colon bacillus. The basophilic percentage of 39 per cent noted on the eleventh day was the highest encountered in any of the animals.

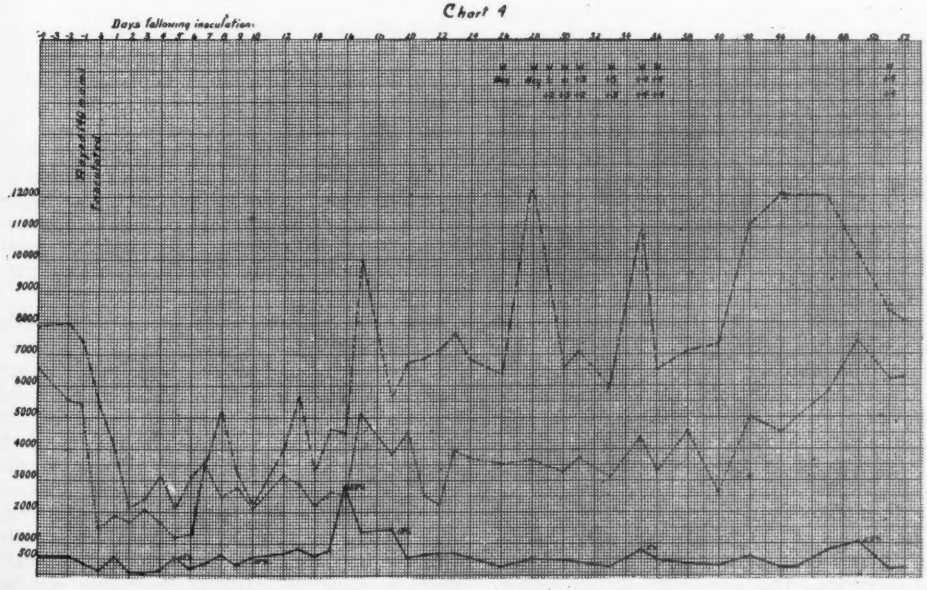
There is, of course, a question as to how far this basophilic increase may have been influenced by the infection from which the animal died 8 days later. In the same series, five other animals inoculated after an exposure of 40 milliampere minutes showed maximum counts of 12, 14.5, 15, 16.5 and 19 per cent. Two animals rayed like the others and then inoculated were given two additional exposures at weekly intervals during the incubation period of the disease. Both animals showed delayed appearance of anatomic lesions and weak or delayed Wassermann reactions. Neither showed any basophilic increase.

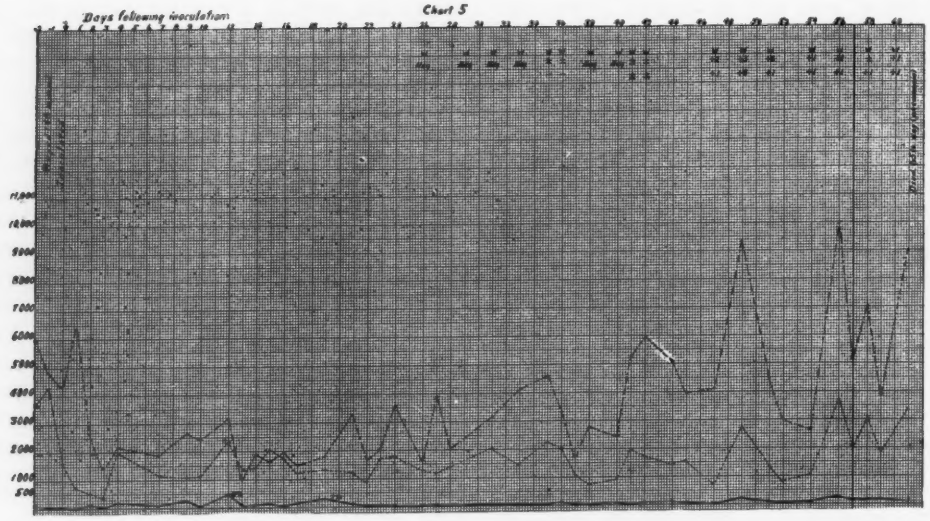
Of the 16 animals in our final series, 7 had been obtained from an amateur breeder whose stock had not previously been used. Preliminary Wassermann reactions on the sera of these animals showed in five a more or less highly developed positive complement fixation, although in no case was there a complete four-plus reaction with both antigens. We had not previously encountered this spontaneous Wassermann reaction. One negative and one posi-

tive animal were used as controls. The other five were inoculated with and without previous raying. The originally Wassermann-positive animals showed a distinct tendency toward increased basophil counts previous to inoculation. The lowest count in any of the group was 6 per cent, the others showing 9 or 9.5 to 11 per cent. On the second day of observation one animal showed 18.5 per cent. Inoculated animals of the group showed normal development of gross lesions and definitely positive Wassermann reactions after the usual interval. They failed, however, to show any higher basophil counts than did the non-inoculated controls. Two animals carried with the series were suffering from "snuffles." They were treated as non-rayed, non-inoculated controls as a check on the question of the influence of non-luetic infections on the basophil count. Their counts were usually within normal limits but one showed 13 per cent on two occasions and the other, one count of 16 per cent. All animals of this series were inoculated with a new strain of virus secured through the kindness of Dr. Wade Brown, who had been using it in his work at the Rockefeller Institute. Seven animals of the series had been obtained from our previous source of supply. All showed negative Wassermann tests in preliminary examinations and in all the basophil count rose after inoculation from initial levels of 2 to 8 per cent to levels of 10 to 12 per cent at the end of the first week and the beginning of the second. There was also a return to 9.5 to 12 per cent at about the end of the fourth week. None of these animals, however showed counts as high as those recorded for our earlier series.

The results in this last series of animals are confusing. They indicate that conditions other than treponema infection are capable of exciting basophilic increase. They fail on the other hand to show any such marked basophilic increase as was observed in earlier series for inoculated as compared with non-inoculated animals. It is possible that the latter peculiarity may have depended upon a difference in the action of the new strain of virus. Further question is raised by the findings in an animal observed during an interval between the work on the last two series. This was a non-inoculated adult female with negative Wassermann reaction. It was given 40 milliampere minutes exposure. The basophil count was originally at a high normal level (9 per cent). On the eleventh day after raying the count was 17 per cent and on the thirteenth day, 11.5 per cent. The indication here is that the x-ray may in itself be capable of exciting basophilic increase in the rabbit.

Chart 4





COMMENT

There has been some hesitation in the publication of the present results because of the limited number of animals in which the leucocyte curve was closely followed and because of the lack of sufficient control work. When there is added the fact that our animals were subjected not only to the ordinary hazards of intercurrent infection but also to such extraordinary insult as the exposure to radiant energy of varying intensities, it becomes evident that such conclusions as may be drawn from the work must be drawn cautiously. Results that appeared atypical or contradictory were obtained in some instances, and more particularly in the animals of the final series. These findings suggest that slight basophilic increase may appear in the rabbit's blood as the result of infection ("snuffles"); possibly as the result of exposure to the x-ray, and finally, as one evidence of some unknown metabolic disturbance that leads also to the appearance in the serum of some substance acting like the "reagin" of syphilitic infection when brought in contact with the lipoidal antigens of the Wassermann test. We are still inclined, however, to accept the more carefully done work of the earlier series as essentially dependable and not altogether to be called into question by later divergences. In the earlier animals, basophilic counts of 25 to 35 and even, in one case, 39 per cent were encountered in inoculated individuals that had originally shown normal differential formulas. No such levels were reached by non-inoculated controls in any series. The basophilic fluctuation in inoculated animals was essentially the same whether the animal had or had not been given x-ray exposure. Animals with "poor take" from the inoculation appeared also to show low basophil levels irrespective of x-ray treatment. Indeed, we came to believe that the severity of the infection might be gauged roughly by the degree to which the basophils were called out into the blood during the incubation period. The pallidum infection appeared to be the one constant factor determining basophilic leukocytosis. It is still possible that some of the very high counts may have been due to a summation of several factors. Thus, in animal 446 of Series V, the count of 39 per cent may have been influenced by an infection that became manifest some days later in the form of a fatal peritonitis.

Basophilic fluctuation in inoculated animals appeared to follow a rather definite course. There was a pronounced rise beginning at about the end of the first week following inoculation and culminating toward the end of the second week. This is the period during which the treponema is proliferating actively in the testis, as we verified in some instances. During the third and the early part of the fourth week the basophils fell to about the normal level, while with the appearance of anatomic and serologic evidence of active infection there was usually

a second rise in the basophils that was of shorter duration and more variable than the primary rise in its time of appearance, height and duration.

Granting that these basophilic changes result from treponema infection, two possibilities occur in explanation. The most natural, perhaps, would be that they constitute a defensive reaction. But it must be conceded that the irritants capable of exciting the basophil must be of quite a different nature than those calling out the other leucocytes. Stimulation of the bone marrow by the common pyogenic infections does not appear to increase the number of circulating basophils: such increase appears to result rather from direct damage to the marrow, as in leukemia. In the special case of spirochetal infection here treated, it must further be pointed out that basophilic increase appeared most marked in the animals that later showed the most highly developed disease lesions. The reaction, if it is defensive must have failed of its purpose. On the other hand, the basophilic increase might be regarded as the result of degenerative changes in the bone marrow. In such a case, animals showing most marked injury from the disease might be expected to show a correspondingly high basophilic leukocytosis. On this basis, the rise culminating at the tenth to the fifteenth day following inoculation might be explained as due to toxic lesions of the marrow resulting from the early activities of the spirochete. The later rise accompanying or following the appearance of local lesions and the presence of "reagin" in the blood may be due to an exacerbation of such lesions coinciding with the local destructive activities of the organism at the inoculation site. This view would best accord with previous reports of basophilic leukocytosis following the administration of hemotoxic substances. That luetic infection damages the blood-forming tissues is not to be doubted. In man, anemia is a common accompaniment of lues and this symptom may be very marked. In rayed animals, direct damage of the marrow tissues due to the x-ray itself might act as a contributing factor in producing increased basophil counts and in non-inoculated animals as a single factor producing the same change but to a minor degree.

It is interesting that even in animals very heavily rayed as, for example, in the rabbit represented in Chart 7, which had received 70 milliampere minutes, the basophils tend to rise at a time and to a degree corresponding with their course in non-rayed or less heavily rayed animals. During a period when all the other

Chart 6

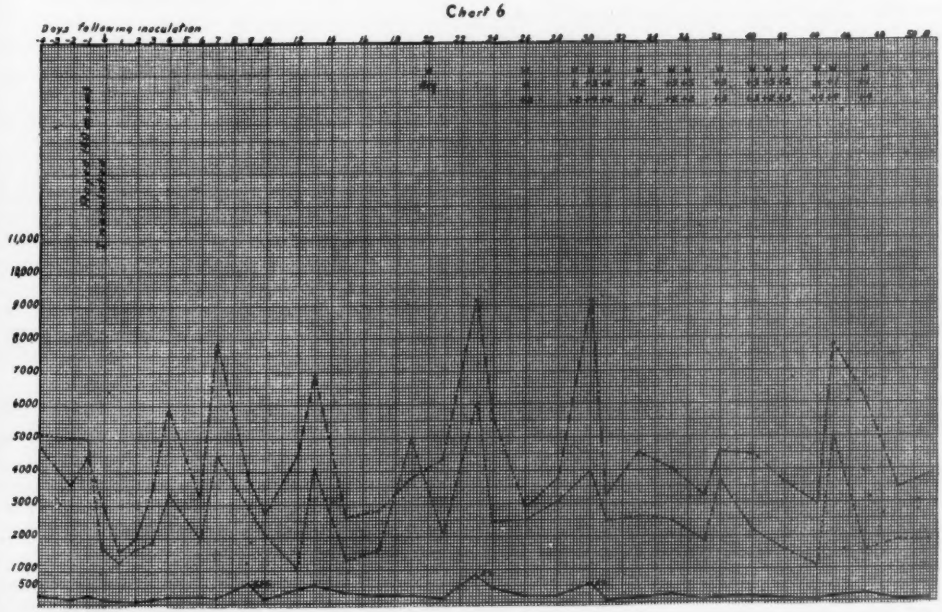
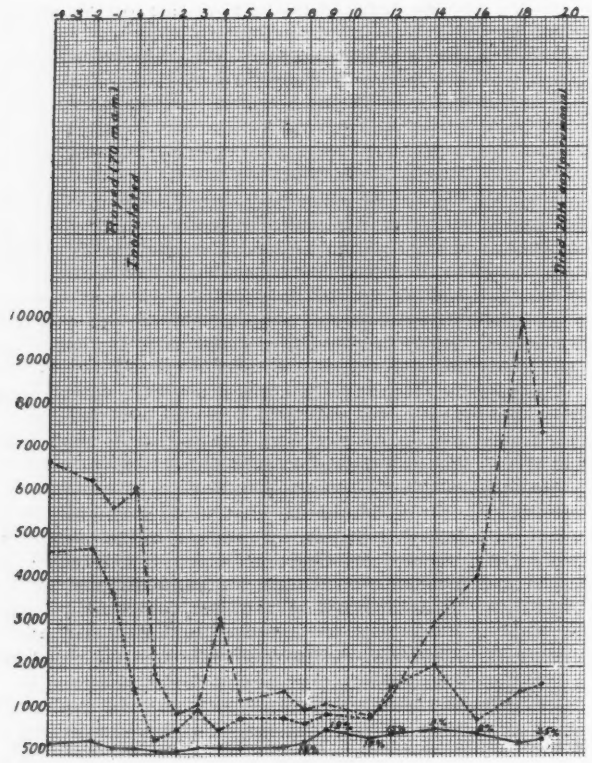


Chart 7



white cells have been driven almost out of the blood stream by an agent actively destructive to the hemopoietic tissues, the basophil not only persists there but actually appears in relative numbers greatly in excess of the normal. The indication is that the basophil is not governed by the same physiological regulation that applies in the case of the other white cells of the blood. It has long been contended that the basophil is not a true functioning leukocyte but that it is rather the product of degenerative changes in cells originally destined as cells of other types. A previous argument in favor of the view that it is a degenerating granulocyte was based on the failure of the gamma granule to react with peroxidase reagents.[8] Sabin[9] has recently favored the view that the basophil is a true leukocyte possessed of granules stainable by vital dyes and endowed with a sluggish motility. It may still be questioned, however, whether such characters are sufficient to establish the cell's claim to recognition as a granulocyte physiologically equivalent to the eosinophil and neutrophil. The present observations are believed to agree rather with the view that the cell is the product of degenerative changes in the blood-forming tissues and that it should not be considered as a true functioning leukocyte.

CONCLUSIONS

(1) Unusual degrees of total and relative basophilic leukocytosis were observed during the course of a study of experimental syphilis in the rabbit. The basophils reached levels of 25 to 35, and, in one instance, 39 per cent of the total leukocytes.

(2) Explanation for such basophilic leukocytosis is not complete on the basis of the work reported. The most constant factor in its production appeared to be the presence of active syphilitic infection.

(3) The reaction is interpreted as the result of degenerative changes in the hemopoietic tissues.

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DISCUSSION (Abstract)

Dr. Charles W. Duval, New Orleans, La.—Do you think there is any connection between this basophilic change and the persistence of the positive Wassermann reaction in the blood?

Dr. Graham (closing).—Because of the interruption of the work before satisfactory control could be carried out, we are hesitant in drawing conclusions. We did not feel that the basophilic changes had any direct relation to immunity processes. As a working hypothesis we adopted the view that the primary and secondary elevations of the basophil curve were expressions of toxic marrow injury, direct during the period of invasion and probably indirect during the period of most intense destructive action in the testis. The middle period of decreased count was regarded as one of temporary marrow recovery.

GASTRIC ANALYSIS AS A FUNCTIONAL TEST*

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Clinical methods of gastric analysis as pertaining to gastric function are fundamentally dependent upon the physiology of gastric secretion, motility and factors of gastric acidity.

It is generally accepted by physiologists that the hydrochloric acid concentration of normal human gastric juice, as secreted by the glands, is much higher (0.45-0.60 per cent) than was formerly believed (0.20-0.35 per cent). Several investigators have suggested that gastric juice may ordinarily be secreted at a constant acidity concentration, but when it is secreted at a rapid rate it has apparently a higher acidity than when secreted at a slower rate. However, this may be due to neutralization and dilution factors.

X-ray studies show that foods in liquid state, depending somewhat upon their composition, may begin almost immediately after ingestion to enter the duodenum and continue progressively until the stomach is empty. The emptying rate of the human stomach even for liquids is not only variable in different individuals, but may vary under different conditions in the same individual. It cannot be accepted that the chyme at a given phase of digestion after a test meal will always be a homogeneous mixture, as samples of contents taken simultaneously from different stomach levels may differ widely in character and acidity.

Carlson, in discussing gastric secretion, states that "actual hyperacidity in the sense of a gastric juice of greater than normal acidity (0.45-0.60 per cent) has not been demonstrated in any disease and probably does not exist." This should not be confused with "clinical hyperacidity" which is a comparative term. The "optimum acidity" of the chyme after a test meal is the resultant of several factors, namely, acid, alkali, dilution and motility, the relationship of acid, alkali and dilution being especially dependent upon motility. Apperly has shown that in an artificial stomach, doubling the rate of emptying produces a far higher and steeper rise of acidity than doubling the acid production. The chief alkalin factors as known to us are: saliva, mucus, secretion of the pyloric glands and the regurgitation of the alkalin duodenal contents.

The dilution of the digestive gastric juice as secreted in the stomach, at a given period after a test meal, is dependent upon: (1) rate of secretion of the gastric juice; (2) amount of fluid taken with the test meal; (3) other diluting factors as saliva, mucus, duodenal contents and secretion of the gastric glands, other than the acid secreting; and (4) the emptying rate during the examination of the particular stomach for its contents.

Do our clinical methods of gastric analysis comply with the requirements of a true functional test or may the results so obtained be misleading as indices to normal and disordered gastric function? The two almost universally used methods of procedure are the single aspiration and fractional.

Those who favor the fractional as a clinical procedure contend that the 45 minute or one hour specimen as obtained in the single aspiration method represents only a single phase of gastric digestion and motility. This is true. However, the fractional necessitates the leaving of a tube in the stomach with frequent disturbance of intragastric conditions which have been shown to affect gastric motility if not secretion. The claim of Pavlow that mechanical irritation does not influence gastric secretion may be questioned. In either method where small samples are taken for examination, this being especially true of the fractional, the variations in acidity of different portions of the gastric chyme must be considered. Therefore, the position of the tip of the tube in the stomach may materially affect the results obtained. To attempt an intragastric mixing of the chyme to overcome this difficulty is in my mind unphysiological.

In both procedures some form of test meal is given. Knapp, in his study of methods of gastric analysis used in various clinics and hospitals, found a very striking difference in test meals employed by clinicians. The same may be said in regard to test meals used in physiological research. Crackers, gruel, indefinite slices of toast, water, tea, alcohol, shredded wheat and bouillon, are most frequently used. We know that the original Ewald meal is so modified in different clinics as to be hardly recognizable. Knapp found that the amount of fluid taken with the test meal varied from 150 c.c. of tea to 500 c.c. of oatmeal gruel. In students without gastrointestinal symptoms using a test meal

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consisting of two slices of zwieback and 400 c.c of distilled water, it was found that at one-half hour after a meal the per cent dilution of the gastric contents by the water of the test meal varied from 36 to 60 per cent with an average dilution of 47 per cent. At one hour the dilution varied from a trace to 44 per cent, with an average of 32 per cent. At 1½ hours the dilution varied from 0 to 42 per cent, with an average of 18 per cent. At 2 hours the dilution varied from 0 to 43 per cent, with an average of 7 per cent. The effect of this variable dilution upon gastric acidity as ordinarily determined is obvious, yet investigators reporting their results may or may not state the amount of fluid given with the test meal.

In clinical work individualization in the selection of test meals and procedures may be indicated, but physiological investigation in the human subject should require a comparative study with standardization of methods that are physiologically sound. The various secretory-motor stimuli and depressants of the stomach, psychic, chemical and mechanical, must be considered.

The gastric response to a test meal varies under different conditions and with the type of meal employed. We can hardly compare results when in one case we use a test meal consisting of two indefinite slices of toast and 150 c. c. of tea while in another we give 500 c. c. of oatmeal gruel or bouillon. Therefore, it is especially important that we standardize the quantity of food taken with the test meal and if possible be able to determine the dilution of the gastric juice by this fluid at a given phase of digestion, and to measure the rate at which this fluid leaves the stomach.

It should be remembered that variable acidity of the chyme after a test meal as determined by modern clinical methods, single aspiration and fractional, may be due to a variation in either acid secretion, alkali, dilution or gastric motility, and, if a small sample as in the fractional is employed, to the position of the tip of the tube in the stomach whence the specimen was obtained. This acidity so determined is not necessarily an index to gastric secretion as is so frequently asserted by both clinician and physiologist.

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DISCUSSION (Abstract)

Dr. A. L. Levin, New Orleans, La.—I believe it would be a good thing to have a standard test meal, but our results will not be so uniform as we should expect them to be for the reason that we cannot find two individuals whose psychic elements are the same. No matter what standard test meal we adopt there will always be a psychological error. The more I do gastric analysis the less I depend upon it to make a diagnosis. It is not a very strong link in the diagnostic chain of evidence, with few exceptions. The work of Pavlow is well known to all of us. He claims that there are two factors in the gastric secretion, psychic and chemical. The French are advocating that the gastric secretion should be studied according to psychic and chemical factors. Cantor undertook this work and his results differ to a certain extent as compared with our fractional method.

The French also advocated, several years ago, a so-called fictitious meal, which is given in the following manner: The stomach is first washed out, then meat, buttered toast and a glass of water are given to the patient who is instructed to chew it very well and spit out the food into a receptacle. From time to time he is instructed to wash his mouth with water. This is kept up for ten minutes. The patient is instructed to rest ten minutes and not even to swallow saliva. The stomach tube is then introduced and from 30 to 90 c.c. of gastric juice is obtained. This is known as normal appetite juice.

In pathology of the stomach a subnormal appetite juice is obtained. Their observations are as follows:

Gastric secretion starts from 30 to 40 seconds from the time the fictitious meal is started and the height is reached during the last five minutes of chewing the meal and is kept up for a half hour, then the secretion stops altogether.

In normal cases they found free hydrochloric acid 1.64 to 1.80, and the total acidity from 1.80 to 1.96.

In peptic ulcer they found from 5 to 7.

In cancer, in eight cases, they found less than 1, and in seven cases none.

In ulcer of the stomach they always found a hyperchlorhydria, from 2.60 to 2.62.

In duodenal ulcer there was no hyperchlorhydria, just an excessive secretion.

In gall bladder cases they found the same as in ulcer cases except in all gall bladder cases with or without stones there was always bile present in the abdominal appetite juice.

In nervous dyspepsia they found the test differed considerably from Ewald's test. The Ewald test in such cases gave free hydrochloric acid 1.80. The fictitious test gave below 1, or 0.73, and in some cases they also found bile.

In tabes with the fictitious test there was no gastric juice at all, evidently due to the fact that the psychic excitory element had been entirely obliterated through the nervous system.

It might be of interest to try this test and compare with the standard we have adopted.

Dr. B. W. Fontaine, Memphis, Tenn.—In absolute contradiction to Dr. Levin, I think it is the easiest matter in the world to standardize the test meal. I make it a routine to give the patient six sago wheat biscuits (the idea was suggested by Dr. Eusterman) with 400 c.c. of water, and at the end of an hour after the meal the gastric contents are withdrawn with an average sized tube, by aspiration and the stomach is completely emptied. In the case of a fractional analysis the standard meal is 400 c.c. of oatmeal gruel.

There are one or two who question the value of the fractional analysis as compared with the single tube method. I think the labor involved in the method of Rehfuss, the fact that the patient takes up an entire room and takes up two to three hours of the time of an assistant, is hardly worth while, or worth the trouble in the average case, and it is my rule as a routine to "tube" them once only. If I happen to find an achylia, I resort to the further study of the case with the fractional method, but I do not use a tube of Rehfuss. The large metal tip of Rehfuss probably irritates the mucous membrane of the stomach to some extent. I prefer to use the tube with a small tip.

The value of the single tube method in extracting all of the contents has been well demonstrated by Franklin White, of Boston. He shows conclusively that if you rely on the fractional method you do not get a pro-admixture of gastric contents, you cannot tell where the tube is, and you may get some parts that will show a higher acidity than other parts.

Dr. D. N. Silverman, New Orleans, La.—The important secretion of the stomach is hydrochloric acid. Hydrochloric acid has a range of from 3 to 1.4 in the gastric content, 3 representing an acidity. If you obtain a hydrochloric content of 3 you know that there is no active hydrochloric acid, in this respect: there is no peptic digestion in this content. We now have a simplified colorimeter which can be carried with you for the determination of hydrogen-ion concentration of gastric content. It consists of test papers, these papers being impregnated with two dyes which we use to distinguish the hyperacidity. The amount of hydrochloric acid is determined by the reaction of it upon the papers. This color change is compared with standard conclusions. They do not deteriorate and are inexpensive.

Dr. Sidney K. Simon, New Orleans, La.—I would like Dr. Gorham to dwell a little further upon the method of phenolsulphonephthalein concentration that he speaks of. I really would like to hear at first hand the exact technical cause, and I believe that most of us here would also like to get that information from Dr. Gorham.

Dr. W. C. Chaney, Memphis, Tenn.—Dr. Gorham's suggestion that the gastric analysis be standardized is certainly a very valuable one and is of particular importance from the standpoint of early diagnosis of pernicious anemia. The absence of free hydrochloric acid in the gastric contents is of such diagnostic importance that the internist must use every means to establish this point. It is for this reason that we have used the fractional method. We have also repeated the test meal when there was a suspicion that an attack of migrain might have interfered with the results first obtained.

Dr. George B. Eusterman, Rochester, Minn.—We all appreciate the work done by Dr. Gorham in the past four years because of its important bearing on gastric physiology in relation to the results of gastric analysis. His work has shown the variation of acid concentration in different portions of the gastric chyme, and more recently he has emphasized the factor of dilution and its effect upon gastric analysis.

In addition to all this, it must be remembered that there are numerous other factors which cause variation in intragastric physiology and which directly influence the results of gastric analysis. On that account the procedure is only of relative importance in gastroenterologic diagnosis, particularly as regards the gastric acidity. In this connection the work reported by Bolton and Goodhart, in 1922, is of considerable, perhaps fundamental importance. Amongst other things, their investigations by the fractional method revealed the importance of duodenal regurgitation as the chief factor in the reduction of gastric acidity rather than dilution of the gastric contents in determining the shape of the curves of hydrochloric acid and of inorganic chlorids. In order to ascertain more definitely the chain of pathologic events taking place in the stomach, they emphasized the importance of not only determining the total acidity and free hydrochloric acid, but the protein chlorids, and especially the hydrochloric acid that has been neutralized by alkalin salts, the inorganic chlorids. Otherwise we have no idea of the percentage of total hydrochloric acid secreted since the inorganic chlorids commonly form a considerable portion of this total, and the curves of free acidity cannot be spoken of as secretory curves at all. They show the value of a complete chlorid analysis, particularly in cases of gastric subacidity. Their practical conclusions drawn from this investigation are very illuminating.

The plea for standardization of the test meal is a timely one. The same may be said for the barium motor meal. The importance of this comes home to us in going over reports submitted by patients from other clinics or internists, in which the discrepancies are often the result of different standards adopted.

Dr. Gorham (closing).—I agree with Dr. Levin that in a given case standardization may be undesirable, and also that the psychic factors must be carefully considered in the interpretation of the results of gastric analysis. If the test meal examination is to be worth while in clinical or physiological investigation, we must have a working standard in order that we may compare the secretory motor response of one stomach to that of another. Our present methods of gastric analysis by means of the test meal examination give us little

accurate information other than to show the ability of the stomach to secrete hydrochloric acid and ferments. In cases with abnormal acidity modern methods give us no information as to which factor or factors are at fault (acid, alkali, dilution and motility). Especially would I emphasize what appears to me to be a common fallacy of both clinicians and physiologists, that is, the interpretation of the "acidity curve" as obtained by the "fractional" method as a "secretory curve."

In the Gastro-Intestinal Clinic of the Washington University Medical School we use a procedure which we have found especially helpful for detecting hydrochloric acid in the stomach contents. The advantage of this method depends upon the fact that the chyme, after a test meal, is not always a homogeneous mixture. A test meal is given and after 45 minutes a Rehfuss type of tube is introduced and the contents of the stomach aspirated in small 5 to 10 c.c. samples in rapid succession until the stomach is empty. Several specimens, when examined separately, may contain no free hydrochloric acid while others may show normal. In such a case, examination at that period of such a small sample as is obtained in the "fractional" or a mixture of the entire contents as in the "single aspiration" procedure may be misleading.

FOOD DIARY*

By THOMAS W. MURRELL, M.D.,
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The use of the protein skin test is unsatisfactory in cases of chronic urticaria, particularly of the facticia type. In these cases with the hypersensitive skin, the controls give a psuedo reaction, and the other proteins cause so varying an amount of congestion as to make interpretation extremely difficult.

With these cases, I have adopted, many times successfully, what I term a "Food Diary." The use of this is based on the fact that most of these patients have their good days and their bad days. The patient is directed to keep a list of every article which passes his lips during the day, and a notation is made at the bottom of each slip as to whether the day has been a good, average, or bad day. Each week he is told to bring these slips to the office, and it is really surprising how often on the good day previous to the bad day, or on the morning of the bad day, you will find some article of food, not on the catalog of the good days.

Two things are gained by this diary: first, by cataloging the foods, which have been used on the successive good days, the patient then has a diet sufficiently varied, and adapted to his individual taste, which may be adopted with impunity, and is not an uncertain generalization; the second is, of course, to find the offending food. This diary is usually kept for six weeks, though the offending food is frequently found within the first two weeks.

Two cases will illustrate its use:

M. P., a Greek, with a typical urticaria facticia, with occasional acute relapses, ran normal for three days. At supper of the third day he ate a lot of salmon salad. The next day was a bad day. Several more good days supervened until another bad day came. The examination of the diet of the preceding day showed Swiss cheese. This was deleted and several more good days supervened. A bad day occurring again, it was noticed that the same foods were taken as on previous good days, but now most of the articles were fried. He was then told to eat no fried foods. His fourth and last bad day followed several drinks of corn whiskey the night before. The elimination of this article and the three offending foods has made a permanent cure.

S. V. R., also had urticaria, but of a more usual type. After a severe attack, an examination of the diary of the day previous showed hot rolls for breakfast. This was shown for several days, and the elimination of hot risen bread was all that was necessary to produce a cure with him. In this case, it was a matter of interest that he took wheat in all of the forms, such as biscuits, baker's bread and crackers without harm, but hot rolls produced a violent urticaria, mainly around the face. It would seem from this that methods of cooking will vary the food chemistry to such an extent as to make the single protein not entirely dependable in indicting the offending food.

*Round Table Discussion, Section on Dermatology and Syphilology, Southern Medical Association, Eighteenth Annual Meeting, New Orleans, La., Nov. 24-27, 1924.

TROPICAL DISEASES AND PUBLIC HEALTH

HOOKWORM REINFESTATION IN SANITATED AND UNSANITATED AREAS*

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In 1922 Cort, Payne and Riley[1] studied a small mountain village in Porto Rico (Area C) which had never been touched by treatment or sanitation. Without attempting to change natural conditions in any way, they surveyed the village and estimated the amount of hookworm infestation by the egg-count method. After giving three routine treatments they estimated the percentage of reduction in the infestation by a second egg-count. A full description of their findings is given in their report (Cort, Payne and Riley, 1923, p. 108). The original data were left in my hands in order that a resurvey might be made the following year.

Their preliminary sanitary survey showed three latrines in Area C, only one of which was in good condition. Soil pollution was very heavy, especially in certain frequented spots, as they well describe.

The village had a total population of 98; of these, 92 were examined for hookworm, and 95 per cent of them were found infested. The average egg-count for each person in the area was 7740 eggs per gram.

After treatment, approximately 40 per cent were cured as shown by the regular microscopical examination, and the average egg-count was 630 eggs per gram, or 83.4 per cent reduction, figured on the basis of the total population.

Thirteen months later the village was resurveyed. Soil pollution was still very gross, and in the same locations as the previous year. One latrine had been built, and one destroyed.

Of the 92 people originally examined, 43 were still present, while there were 17 new people in the village. The total population had therefore diminished from 98 to 60.

Of these, 51 were examined, including 35 of those in the original survey. Only 4 people were found negative—2 old inhabitants and 2 recently born babies. The infestation rate was therefore practically back to its former level.

Several of the new arrivals had had treatments in other districts and several were babies. However, in one year the egg-count per person had increased from 630 eggs per gram to 3403 eggs per gram for all inhabitants, or 44 per cent of the original infestation.

Of the 35 people examined both years, all except one had been treated the first year, and 11 had been cured. All 11 were reinfected.

The average egg-count of the 35 in 1922 was 5020 per gram. This was reduced to 630 per gram by treatment. In 1923 the average count was 3945 eggs per gram, or 79 per cent of the original egg-count. This is considerably more than the average for all inhabitants.

A positive history of mazamorra (ground itch) during the past year was given by 19, while 18 gave a negative history. The others were not questioned.

Shortly after Cort, Payne and Riley conducted their study, Hill[2] studied three adjacent rural areas (Areas 1-2-3) near the coast, containing about 300 people. Approximately six months after latrines had been installed at all houses of the whole municipality to which these areas belong, the inhabitants were given hookworm treatment in the course of the regular intensive campaign. The areas specially studied, lying within a mile of each other, were fairly thickly settled, representing average rural conditions in the northwestern coastal plain. They are described in detail in the original paper.

On examination, the infestation rate was found to be 89.7 per cent and the average count was 2820 eggs per gram. After three treatments, the average egg-count was 215 eggs per gram, a reduction of 92 per cent. However, since this was in the regular campaign, treatment was continued to those who were positive after third treatment until 78 per cent of those treated had been cured. Thirteen people remained untreated, and while egg-counts were not made after the final treatments, the total reduction in mass infestation is calculated to be approximately 97 per cent. In this respect these Areas 1-2-3 differ from Area C of the first study.

One year later, while many latrines were not in perfect condition, yet all seemed to be in use, and soil pollution was not seen except in a few scattered instances.

*The studies and observations on which this paper is based were conducted with the support and under the auspices of the International Health Board of the Rockefeller Foundation.

TABLE I
HOOKWORM INFESTATION IN TWO DIFFERENT AREAS ONE YEAR AFTER TREATMENT

Area C	Census	Examined	Infested	Per cent Infested	Treated	Cured	Remarks
1922	98	92	88	95	82	27+	Only 69 exam. after treatment
1923	60	51	47	92	---	---	
Areas 1-2-3							
1922	282	282	253	89	240	197	
1923	276	262	135	51.5	---	---	

The resurvey of the areas showed 51 per cent infestation. The average egg-count of the whole population, including new arrivals, was 338 eggs per gram, or 12 per cent of the original count.

Two hundred and thirty-six persons were present both years. Out of the 217 who were originally negative, or cured in 1922, 108 (49 per cent) were positive in 1923, but their average count, originally 2680 eggs per gram, was now 262, or less than 10 per cent of their original count. This is appreciably less than the average for the whole area, whereas in Area C the average for those present both years was more than the average for all inhabitants.

There is thus a wide difference both in the infestation rate and in the intensity of infestation as measured by the egg-count, between these two areas one year after treatment. The first area (Area C), originally heavily infested, returned in one year to the former rate, while the egg-count indicates that infestation is almost half as intense as before. Among those present both years, the count indicates 79 per cent of the original intensity of infestation. Areas 1-2-3 have half the original rate of infestation one year later, but the egg-output is only 12 per cent of the former production.

There are four principal factors tending to produce this difference.

(1) Sanitation.

In the mountain area (Area C), there were practically no latrines. Soil pollution, which was very gross before treatment, continued undiminished. New people moved into the village. There was some transient population. All contributed to the pollution of the soil, which was general not only throughout the village, but also in the entire section to which the village belonged. Opportunity for reinfestation was therefore abundant. Many of the inhabitants gave a history of recent mazamorra—ground itch.

On the other hand the coastal areas (Areas 1-2-3), together with the entire surrounding territory, had had latrines installed prior to treatment. They had become accustomed to their use, and soil pollution, while it occurred, was not the rule.

(2) Treatment of the surrounding population.

In Area C only a small village was treated,—an isolated unit in an untreated, unsanitated area. Soil pollution continued, both in the village and on the fincas where many of the treated adults worked with heavily infested, untreated, individuals. From the untreated population, without latrines, as well as from the uncured inhabitants of the village, there was ample opportunity for reinfestation.

In Areas 1-2-3 the surrounding population was all included in the general treatment campaign, thus reducing possible soil infestation even if soil pollution continued.

(3) Occupation.

The male inhabitants of Area C usually worked on a small sugar plantation, while many of the women picked coffee during the season. Many of them ascribed their recent ground itch to the coffee groves. It is probable that their infestation was being considerably added to while at work as well as in the village.

The people of Areas 1-2-3, on the other hand, were as a rule laborers on small farms where there was not the concentration of labor that was to be found in the coffee groves and cane fields, and where, therefore, the probability of infestation was not so great.

(4) Residual infestation.

The original infestation in Area C was twice as heavy as that in Areas 1-2-3. In the first

TABLE II
INTENSITY OF INFESTATION IN AREAS C AND 1-2-3 ONE YEAR AFTER TREATMENT

Area C	Average egg-count per gram Before treatment	After 3 treatments	Percent reduction	Remarks
1922	7740	630	83.4*	
1923	3403	.....	---	44 per cent of original infestation
Areas 1-2-3				
1922	2820	215†	97	
1923	338	.....	---	12 per cent of original infestation

*Based on total population.
†Treatment continued to positives.

TABLE III
INFESTATION IN THOSE PERSONS PRESENT IN BOTH SURVEYS IN AREAS C AND 1-2-3

	Number present both campaigns	Number examined	Number infested	Percent infested	Treated	Cured
Area C		35	35	100	24	11
1922	35					
1923	35	35	33	94	....	....
Areas 1-2-3		236	213	90	207	194
1922	236					
1923	236	236	108	48	....	....

area the reduction was only 84 per cent, while in the latter it was approximately 97 per cent. There remained in Area C a considerable residual infestation. This, in connection with the lack of sanitation, is undoubtedly significant. It would explain the observation that the rise in infestation in those persons present both years was greater than the average for the whole group in Area C, and less than the group average in Areas 1-2-3.

It is impossible, with the available data, to determine definitely the relative importance of the above factors. Possibly the different factors rank in importance in the same order in which they are given.

The question arises why the coastal areas, with favorable conditions, show such a high percentage of reinfestation. This high rate may seem disturbing; but it must be recalled that the egg-count showed only 12 per cent of the previous infestation. This same condition has been found in other areas studied in Porto Rico,[3] and is the result mainly of the following six conditions:

(1) Heavy original infestation. Practically 90 per cent of the rural population of the island is infested with hookworms. Taking into consideration all the factors involved in the spread of the parasite, it is natural that reinfestation should be more rapid than in countries where the original infestation is not so heavy.

(2) Dense population. The average density of population in Porto Rico is almost 400 per square mile. Such concentration is favorable to reinfestation.

(3) Migration of workers to unsanitated areas in search of employment. They pick up infection and bring it back with them.

(4) New arrivals from untreated areas. As the zone of treatment extends, this number will be reduced. At present it is a consideable factor.

(5) Untreated individuals and those who discontinued treatments. This group, with group 4, shows the largest number of worms in all treated areas. Both are dangerous as potential disseminators of the disease.

(6) Imperfect sanitation. Reinfestation is highest where sanitation is poorest, as has been shown in work in other areas.[3] No matter what precautions are taken, there is always some soil pollution, which when considered with the factors enumerated above, is bound to produce some reinfestation. Fortunately, where soil pollution is scattered and casual, as is the case in well sanitated areas, the egg and worm counts show that the number of parasites harbored is relatively small, even though the infestation rate may be high.

SUMMARY

Two areas in different parts of Porto Rico were treated for hookworm disease, and a year later were resurveyed. The first area, situated in an untreated, unsanitated section of the island, was treated without preliminary or subsequent sanitation of either the area itself or the surrounding territory. In the second area, latrines were constructed at all houses of it and the surrounding territory some time before treatment. Treatment also included the territory affecting the area.

In the first area the intensity of infestation was reduced approximately 84 per cent, while it was reduced 97 per cent in the second area.

Resurvey one year later showed reinfestation universal in the first area, with the intensity half that of the previous year. In the second area almost half the inhabitants harbored hookworms, but the intensity was only 12 per cent that of the pervious year.

TABLE IV
AVERAGE EGG-COUNT PER GRAM IN THOSE PERSONS PRESENT IN BOTH SURVEYS

	Number present both campaigns	Average egg-count per gram Before treatment	After treatment	Remarks
Area C				
1922	35	5020	680	
1923	35	3945	.....	79 per cent of original intensity
Areas 1-2-3				
1922	236	2680	142	
1923	236	262	.....	10 per cent of original infestation

The conditions causing this difference in degree of reinfestation are discussed.

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STUDY IN HOOKWORM INFESTATION IN JONES COUNTY, MISSISSIPPI, 1924*

By H. H. HOWARD, M.D.,
Director for West Indies International Health Board.

In 1911 a survey was conducted in Jones County by the State Board of Health and the Rockefeller Sanitary Commission for the purpose of ascertaining the rate of hookworm infestations and to render thymol treatment available to those found infested. The results of the survey as given in the Second Annual Report of the Rockefeller Sanitary Commission are as follows:

Number of children examined, ages 6-18....1108

The number found to be infested is not given but the rate of infestation is said to be high.

TREATMENTS ADMINISTERED

1st Treat	2nd	3rd	4th	5th
2532	1462	896	103	2

In 1914 with the same agencies cooperating, a second survey was made, which included also the inspection of privies at a number of homes, and as before, treatments were offered to those found infested with hookworms.

The results of the second survey were reported as follows:

Of 1408 school children, ages 6 to 18, examined, 1161, or 82.5 per cent were found infested with hookworms. The total number examined including adults was 2819 of which 1716, or 60 per cent, were found infested, the rate of infestation being much lower in adults than among children of school age.

The Sanitary Survey included 890 homes of which number 512, or 57.5 per cent were reported to have had open-back privies, and 378, or 42.5 per cent, were without privies.

In connection with the malaria survey of Jones County, conducted by the State Board of Health and the International Health Board in 1923, a sanitary survey was made of 1346 rural homes. Eight hundred and seven of these homes, or 59.9 per cent, had open-back privies and 539, or 41.1 per cent, were without privies. Twenty-eight rural schools were also surveyed. Ten were found with two privies each, seven with one privy each and eleven without privies. All of the school privies were open-back, or of equally insanitary types.

In the autumn of 1924, a favorable opportunity was afforded the writer to investigate the rate of hookworm infestation among children of school age (6 to 18 inclusive) and also to estimate the severity of individual infestations by the use of the Stoll egg counting method[1] in a limited number of cases.

An intensive hookworm campaign was inaugurated and during a six weeks period thirty-seven of the rural white schools were visited and illustrated talks on the hookworm, hookworm diseases, and soil pollution were given.

From the teachers and pupils of these schools 2119 fecal specimens were obtained and examined. Some of these specimens being from persons under five and over eighteen years of age are omitted from these data. Of 1774 specimens from children of school age 1335, or 75.8 per cent were found positive to hookworm ova. The proportion of males in this group was 50.9 per cent and the rate of infestation among males was 80.5 per cent, while among females the rate of infestation was 70.9 per cent.

The rates of infestation by age groups and sexes is shown in Table I. As would be expected, the lowest infestation rate is found in the age group of from 5 to 8 (6-7) for both sexes, with the lowest rate for females. For the combined sexes the highest rate occurs in group 14 to 18, the largest age proup included in our examinations.

Fecal specimens to the number of 137 were secured from three colored rural schools and examined, showing the low infestation rate of 22.6 per cent. Among the negro school children there was practically no clinical evidence of hookworm infestations, and in those specimens positive to hookworm ova only a few ova were found in each smear.

*The studies and observations upon which this paper is based were conducted with the support and under the auspices of the International Health Board of the Rockefeller Foundation.

TABLE I

PERCENTAGE RATES OF INFESTATION BY SEXES AND AGE GROUPS

Ages	Sex M	F	Both
6-7	66.2	61.9	63.8
8-9	73.3	67.3	70.4
10-11	87.6	74.3	80.9
12-13	83.1	76.6	79.9
14-18	87.9	74.8	82.2
Totals	80.5	70.9	75.8

During the year 1924, 1051 children in the city schools of Laurel were examined microscopically and 270, or 25.6 per cent, were found to be infested with hookworms, though marked clinical evidence of the infestation was rare.

The Willis levitation method[2] was used in examining feces for hookworm ova.

Egg Counts.—For the purpose of obtaining some idea of the degree of individual infestations egg counts were made of twenty-five specimens derived from the pupils of four rural schools (white), located in different parts of the county. One ounce tin containers were issued to the pupils of these schools with the request that they be returned two-thirds full of feces. A large number of the pupils responded with specimens. From these specimens about 35 were taken and examined by the Willis levitation method for hookworm ova. The first 25 found positive were taken for egg counting. The identities of the individuals from whom the 25 specimens came were not a consideration, nor was any process of selection employed beyond the examination for hookworm ova by the Willis method.

The method used in egg counting was that of Stoll slightly modified.[1]

The ounce containers were generally two-thirds full. After the feces in the container was thoroughly stirred, the container together with a small wood spatula was balanced on the scales and one gram of feces weighed out by difference, and placed in a shoulderless, wide-mouthed, glass stoppered bottle of 60 c. c. capacity graduated to 15 c. c. Sodium hydroxid in decinormal solution was then added to the 15 c. c. mark, eight on ten small glass beads were added, the bottle stoppered and shaken for several minutes until the fecal mass was thoroughly broken up forming a homogeneous suspension. Immediately 0.15 c. c. of the mixture was transferred to a 2 x 3 slide and covered with a 22 x 40 mm. coverslip. With a mechanical stage and the low power of the microscope all hookworm ova on the slide were counted. A second sample was prepared from the same specimen and examined and the average number of ova for the two was recorded. This number multiplied by 100 represents the number of hookworm ova per gram of feces. An automatic counter and the Muench special eyepiece diaphragm were found to be very helpful.

TABLE II—EGG COUNTS ON TWENTY-FIVE CASES

No.	Age	Sex	Character of Stool	Egg Counts 1st	2nd	Average	Eggs pr Gram
1	16	M	Mushy	20	20	20.0	2000
2	11	M	"	26	25	25.5	2550
3	12	F	"	86	89	87.5	8750
4	11	M	"	10	10	10.0	1000
5	11	F	"	13	11	12.0	1200
6	5	M	"	39	27	33.0	3300
7	11	M	"	52	47	49.5	4950
8	14	M	"	38	39	38.5	3850
9	15	M	"	67	71	69.0	6900
10	11	F	"	95	110	102.0	10200
11	14	M	"	7	7	7.0	700
12	13	F	"	7	8	7.5	750
13	5	M	"	7	11	9.0	900
14	16	F	"	40	40	40.0	4000
15	10	M	"	35	42	38.5	3850
16	9	F	"	13	15	14.0	1400
17	7	M	"	17	19	18.0	1800
18	9	M	Formed	15	16	15.5	1550
19	9	M	Mushy	16	18	17.0	1700
20	13	F	"	18	18	18.0	1800
21	15	M	"	117	116	116.5	11650
22	16	M	"	215	220	217.5	21750
23	11	F	"	33	35	34.0	3400
24	12	M	"	50	56	53.0	5300
25	7	M	"	65	73	69.0	6900

It will be noted in Table II that only one "formed" stool was encountered in the twenty-five subjected to egg counting, the others being "mushy." Stoll states that "it is necessary to acknowledge in using egg count data the important fact that there is a natural dilution of the ova in mushy stools before egg counting."[3] He further deduces in effect that in a given individual harboring a certain number of female hookworms, a formed stool will represent per gram of feces approximately twice as many ova as a mushy stool from the same individual, and advises for purposes of comparison that the egg counts of all mushy stools be raised to the "formed stool basis" by being doubled. Table No. III represents the twenty-five egg counts raised to the "formed stool basis."

Smillie says: "In making a hookworm survey of a new field the fact that interests us most is not the percent of individuals infested with hookworms, but the percent of individuals who have hookworm disease."[4]

It is also stated that it is just as important to know the number of eggs which are being deposited on the soil by hookworm infested individuals as it is to know the numbers of worms present, since this information will form the basis for studies of dissemination of the parasites, and for planning control measures.[5]

These statements apply with equal force in

TABLE III

Egg Counts No.	Age	Sex	Formed Stool Basis Ova per Gram
1	16	M	4000
2	11	M	5100
3	12	F	17500
4	11	M	2000
5	11	F	2400
6	5	M	6600
7	11	M	9900
8	14	M	7700
9	15	M	13800
10	11	F	20500
11	14	M	1400
12	13	F	1500
13	5	M	1800
14	16	F	8000
15	10	M	7700
16	9	F	2800
17	7	M	3600
18	9	M	1650
19	9	M	3400
20	13	F	3600
21	15	M	23300
22	16	M	43200
23	11	F	6800
24	12	F	10600
25	7	M	13800

fields not new, where, as in Jones County, the original rate of infestation is known to have been high, where only a fractional part of the population known to be infested was treated, where a long period of time has elapsed since any systematic treatment has been administered, and where general soil pollution has continued unabated.

While it seems to have been tacitly accepted that with a low rate of general hookworm infestation the more severe types of hookworm disease are rarely met with, and that as the infestation rate advances these types become more common, as yet no definite relationship between the general infestation rate and the incidence of hookworm disease has been announced, nor has it been determined what maximum number of hookworms may infest the individual host without producing measurable clinical evidence of their presence.

It is probable that there are several indeterminable factors involved, such as individual resistance, the length of time the infestation has been carried, etc., which will render such determinations difficult or impossible. It is because of this situation that the Stoll egg counting method has met with welcome as a means by which the degree of individual infestation may be estimated.

In the survey of 1914 the infestation in Jones County was found to be 82.5 per cent. It is presumable that the method of examination used was the direct smear, though it is possible that some infestations were diagnosed clinically.

The infestation rate in the survey of 1924 was 75.8 per cent. As a more accurate technic, —the Willis levitation method—was used in this survey it is possible that the two rates arrived at by different methods of examination do not fully represent the actual difference in the incidence of hookworm infestations in the two surveys.

In the survey of 1924 the incidence of infestation by age groups and sexes was not unusual. The infestation rate among males of school age was 80.5 per cent, and among females of school age, 70.9 per cent, the difference being due probably to the more active and careless habits of the males which bring them more frequently in contact with larvae infested soil. In both males and females the rates were lowest (63.8) for the age group " 5 to 8," and highest in the age group "14 to 18" (82.2). In the first instance contact with infested soil has been comparatively infrequent. In the second instance our rate, 82.2, represents practically the sum of all infestations acquired throughout the entire barefoot period.

The comparatively low rate of 25.6 per cent met with in the city schools is likely due to better sanitary environments, and also probably to the earlier adoption of shoes by children in the city.

While the infestation rate of 22.6 per cent among negro children is low, yet it has been noted often before that the negroes of the Southern states seem to possess a degree of immunity to hookworm infestations, or at least when living under apparently the same environment as the whites they have generally shown a markedly lower rate of infestation. The same peculiarity is noted with the West Indian negro as compared with the coolies (East Indians), imported to the West Indies as labor.

The sanitary survey of 1914 showed 57.5 per cent of the homes equipped with open-back privies and the remainder with none. The survey of 1923 showed 59.9 per cent of the rural homes having open-back privies, the remainder none. Though a period of nine years intevenes between the surveys, there has been very little change as regards soil pollution. Certainly the apparent drop in the rate of hookworm infestation among white children of school age from 82.5 per cent in 1914 to 75.8 per cent in 1924 cannot be attributed to improvements in soil pollution control. No mention is made of school privies in the survey of 1914. In 1923 a survey of 28 rural schools showed that 35 per cent were equipped with privies for both sexes, 25 per cent with privies for the girls only, and 40 per cent were without privies. All school privies

were open back or of equally insanitary type. Referring to Table III we find for the twenty-five egg counts an average of 8914 hookworm ova per gram of feces. Eliminating cases Nos. 21 and 22, which present the exceptionally high egg counts of 23,300 and 43,500 respectively, which might not occur in like proportion in a larger series of counts, we still have an average of 6784.7 ova per gram of feces for the remaining twenty-three individuals.

Proceeding with Stoll's method and using the number 44 as a divisor we find that theoretically we have an average of 202.6 female hookworms to the individual. Assuming with reasonable grounds that the hookworms harbored by the individual are approximately equally divided as to sex, we have an average of 405.2 worms of both sexes to the individual case, and as the minimum and maximum number of worms harbored by the individul we have 63.6 and 1977.2 respectively.

Had the time available, and a larger personnel permitted we would have made egg counts of a larger number of people, and also have attempted to establish a more definite relationship between the egg contents per gram of formed and mushy stools for this region, and thus enhanced the value of our findings.

It would seem then that the incidence of hookworm infestations was only slightly lower in Jones County in 1924 than it was in 1914, and from the results of the egg counts the indications are that the average number of worms per individual is large, fully justifying the conclusion that the frequent cases of under development and marked anemia which are met with among children are the clinical manifestations of uncinariasis. To render the situation more difficult the general impression with the public seemed to be that hookworm disease was a thing of the past, having been disposed of by previous treatment campaigns.

A very similar situation was met with by the writer in Porto Rico in connection with the activities of the International Health Board in that country. In Porto Rico the Anemia Commission was in operation from 1904 to 1910. According to its reports practically a third of the entire population of the island were treated for uncinariasis. Subsequent to 1910 and until 1920 the Insular Government continued to operate dispensaries for the treatment of the disease, and at one time during this period there were 39 dispensaries in active operation. It may be said then that treatment for uncinariasis had been vigorously carried forward for six years, and then continued for 10 years as a matter of routine in many localities. While the importance of the control of soil pollution as a necessary measure for the prevention of the transmission of hookworm infestations was strongly urged by the Anemia Commission practically nothing was accomplished in rural sections up to 1920, and while great numbers of people were temporarily relieved of their worms by this prolonged treatment campaign, yet evidently most of them, because of a condition of general and intense soil pollution were quickly reinfected. A survey made in 1919 showed that the rate of infestation in Porto Rico in rural sections was approximately 90 per cent. Subsequently in the intensive treatment campaigns of 1920 to 1924 the findings of the survey were confirmed in the examination of practically one-tenth of the entire rural population of the island. The infestation rate in urban popultions has varied from 40 to 60 per cent. The average individual infestation has also been found to be heavy. Worm counts of 64 unselected cases gave an average of 419 worms per person, 572 per rural inhabitant and 216 for the urban dweller. Egg counts in approximately 1000 cases have not appreciably lowered this estimate. It is probable then that in 1920 uncinariasis was practically as extensive in Porto Rico as ever, with the individual infestation of high intensity. In addition there was much indifference regarding the disease from apparently two causes: Many mistakenly believed that the disease had been practically eradicated by the 16 years of more or less systematic treatment, and others, recognizing its continued presence, thought that everything possible had been done for its relief and control with only partial success, which was the best that could be hoped for.

Since 1920 when the International Health Board began to cooperate with the Porto Rico Government in intensive campaigns for the relief and control of uncinariasis it has been made a condition that each area of operation must be sanitated at least six months in advance of treatment campaigns, thus allowing ample time for infested soil to become free from hookworm larvae, and protecting those treated and cured as well as all others from reinfestations.

As a result of this effort at presanitation 50,000 latrines of very satisfactory and permanent construction have been built by the people in rural sections at their own expense and under the supervision of qualified government sanitary inspectors.

As an instance of the importance of sanitation in the control of uncinariasis attention is directed to certain quantitative studies conducted in Porto Rico by Drs. Cort, Payne and Hill which will be published soon in the SOUTHERN MEDICAL JOURNAL under the title "Hookworm Infestations in Sanitated and Unsanitated Areas." Briefly it is shown by these studies that in unsanitated areas the infestation as measured by the egg count returned to over 50 per cent of the original intensity one year after the treatment of all infested, while in sanitated areas the infestation one year after treatment was only 12 per cent of the original infestation.

Granting that, because of tropical conditions and the fact that the entire rural population goes barefoot, conditions are more favorable in Porto Rico for hookworm transmission than in the Southern states still the parallelism remains and the observations in Porto Rico should prepare us for just such conditions as were met with in our survey in Jones County where both the original infestation rate and the incidence of hookworm disease were high, where but a small part of the infested group were treated, and where practically no control of soil pollution was established in rural sections.

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SURGERY

RAILWAY, INDUSTRIAL, GYNECOLOGICAL, OBSTETRICAL AND UROLOGICAL

A NEW USE OF THE FLUOROSCOPE IN LITHOLAPAXY*†

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The close relationship that has existed between the urologist and the roentgenologist in the past few years has made it possible to diagnose a very large percentage of urological cases where otherwise failure existed. Goldstein and Ashbury in a paper read three years ago before this Section reported that where a combined examination was made by a urologist and roentgenologist, positive diagnoses were made in 97 per cent of cases. With the increased percentage of cases diagnosed there undoubtedly followed better rsults in the treatment.

The application of fluoroscopy to the intestinal tract and chest cavity was soon followed by its application to the urinary tract, so that at present in many institutions the fluoroscope is used at the operating table in cases of renal calculi. Fluoroscopy has been used recently by the urologist in visualizing the ureter and renal pelvis after injections of opaque solutions.

For many years vesicle calculi of large size were treated by the old operation of lithotrity. Later the operation of suprapubic lithotomy came into vogue. In 1878, Bigelow introduced his operation of litholapaxy, which enjoyed many years of success. With the introduction of better technic in surgery, suprapubic lithotomy again returned into prominence, and today both procedures are practiced, depending on the type of case and the experience that the individual operator may have with one or the other. One has only to examine comparative reports of litholapaxy and lithotomy given out by Van Buren, Freyer, Keegan, Cabot, Keyes, Barney and Crenshaw and he will readily observe that the results are better and the mortality lower in the closed operation.

The one great disadvantage of the closed operation is the fact that it is performed blindly; that is, the stone is crushed with the lithotrite in the bladder where it can not be observed by the operator. It is only natural to expect that when an operation is performed blindly, accidents will occur regardless of the ability of the operator. While these have not been extensively reported, Melville and Clark report cases of ruptured bladder following litholapaxy. The author has seen two of these, in both of which peritonitis resulted. One was recognized and recovered. The other was not, and death resulted.

IMPROVEMENTS MADE IN THE PROCEDURE

In all probability the above mentioned conditions, with other injuries and complications that have resulted from litholapaxy, led Nitze, Casper and Lewis, followed by G. Walker in 1907, to introduce cystoscopic lithrotrites. These were an improvement over the old instrument in that one could observe the procedure, but also had their disadvatages in that they were adaptable only for small, soft stones, and that the field became clouded with blood or crushed stone.

In 1909, Young introduced his cystoscopic rongeur, which can be used for removal of small stones. Working on the principle of Bigelow that a large calibred evacuating tube is necessary, Young, in 1910, combined one with a cystoscope and introduced the first large calibred evacuating cystoscopic lithrotrite. This likewise suffered some mechanical defects in its application, and is now not employed. Not satisfied with the methods employed, Goldstein and Lutz devised a method by which the operation of lithotrity or litholapaxy is made a safe and rapid procedure, and at the same time is visualized without the aid of the cystoscope. This is performed by combining litholapaxy with fluoroscopy in an air medium. This medium has previously been reported before the Section on Urology of the American Medical Association. Some changes in technic and the operation of additional cases prompted me to make this report.

TECHNIC OF NEW METHOD

Several modifications have been made since the original method was devised. The patient is placed in a dorsal elevated position on the

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TABLE 1.—REVIEW OF CASES

Case	1	2	3
Name	M. S.	H. H.	S. H.
Age	68	69	60
Roentgenogram	Positive	Positive	Positive
Number of calculi	3	2	3
Size of calculi	4x3 cm., 4x3.1 cm., 0.7x0.5 cm.	2.5x2.5 cm., 3.2x2.1 cm.	4x3 cm., 3x2.5 cm., 4x2.5 cm.
Consistency	Phosphatic	Phosphatic	Phosphatic
Nucleus of calculi	Pus and debris	Fibers of gauze	Unknown
Previous calculi	Yes	No	Yes
Previous operations	Suprapubic lith. and prostatectomy	Suprapubic prostatectomy	None
Previous attempts at crushing	None	None	7 times
*Time of operation	18 minutes	15 minutes	15 minutes
Exposure time	6 minutes	4 minutes	4 minutes
Number of times lithotrite used	2	1	1
Anesthesia	None	5 per cent procain	Spinal
Number of sittings	4	2	2
Number of days spent in hospital	4	5	1
Medium used	Air	Air	Air

*This time did not include time taken for the removal of the crushed stone.

fluoroscopic table. Preparation is the same as for cystoscopy. The operation should be performed under some form of anesthesia, sacral being the one of choice. The operator should remain in a darkened room at least ten minutes prior to the operation so that his eyes will become adapted to the special conditions. It is essential for the external meatus to be sufficiently large to admit a large calibred instrument (34 French); therefore an external meatomy is performed. A soft rubber catheter is inserted into the bladder, the urine empied, and the bladder is irrigated with some antiseptic solution. The bladder is next examined under the fluoroscope and is located by observing the presence of the catheter. This is then drawn out so that there is no curling of the catheter. With a 100 c.c. syringe that will fit the catheter, air is injected slowly into the bladder to the full capacity as determined with fluid on some previous occasion. When the bladder is sufficiently distended, the catheter is removed. The calculus as seen under the fluoroscope appears as a dark shadow, and the air as a light shadow; therefore a direct contrast can be observed. Observations should be made as the air is being injected by an assistant, as the eye becomes better accommodated to the contrast of shadows. In the presence of a calculus, the air will be observed surrounding it.

The lithrotrite is next introduced into the bladder in the usual manner, special care being taken in passing it through the posterior urethra and then into the bladder. No pressure should be exerted. After the instrument has passed the vesicle neck, there should be no attempt made at pushing the instrument without observing conditions under the fluoroscope. With the fluoroscope, the beak can be seen in the bladder. This should be turned from side to side, and the blades opened and closed. With the blades open, which is easily seen, the calculus is again located and grasped. When a stone is caught between the blades, they should be locked. The beak of the instrument should be turned from side to side, and the calculus will be seen carried across at the same time. The next step is the crushing of the stone. This can readily be observed if the beak is turned to one side or the other. After the original stone is crushed, any large pieces that remain can be crushed likewise; or, if more than one stone is present, these can be treated in a similar manner. After the crushing procedure is completed, the blades are opened and closed two or three times under direct observation but always keeping the blades at least

TABLE 2.—REVIEW OF CASES

Case	4	5	6
Name	H. J. M.	M. J.	E. L. F.
Age	50	60	60
Roentgenogram	Positive	Positive	Positive
Number of calculi	1	1	2
Size of calculi	3.8x3 cm.	6x3 cm.	4x3.8 cm., 4.5x4.3 cm.
Consistency	Phosphatic	Phosphatic	Phosphatic
Nucleus of calculi	Unknown	Unknown	Unknown
Previous calculi	Yes	No	No
Previous operations	No	No	No
Previous attempts at crushing	None	None	None
*Time of operation	50 minutes	70 minutes	45 minutes
Exposure time	6 minutes	7 minutes	7 minutes
Number of times lithotrite used	2	1	1
Anesthesia	Sacral	Sacral	Sacral
Number of sittings	2	2	1
Number of days in hospital	8	8	5
Medium used	Air	Air	Air

*This time includes the time taken for the crushing and removal of the stones.

TABLE 3.—DETAILS AND RESULTS

Case	1	2	3
Name	M. S.	H. H.	S. H.
Evacuator	Used	Not used	Not used
Rongeur	Used	Used	Used
No. of large pieces removed	14	10	12
Size of largest piece	1.6x1.2 cm.	1.5x1.1 cm.	1.8x1 cm.
Weight of pieces removed	430 grains	310 grains	550 grains
Amount of air	350 c.c.	150 c.c.	100 c.c.
Catheter drainage	None	For 2 days	None
Hemorrhage	None	None	None
Accidents	None	None	None
Incontinence	None	Terminal dribbling	None
Residual urine before operation	30 c.c.	50 c.c.	25 c.c.
Residual urine after operation	None	None	None
Complications	None	None	None
P. O. Cyst	Bladder normal except for a few cellules	Normal	Very small median lobe of prostate
Mortality	0	0	0
Results	Cured	Cured	Cured

two or three millimeters apart, until one is ready to remove the instrument.

The blades should never be brought tightly together but always kept at least two to three millimeters apart. The reason for this is that if the blades are brought together tightly the fine powder that results from the crushing, is caught in the female blade and obstructs the male blade from riding over it. This is very easily observed with the fluoroscope. In a case of mine it became so obstructed that the blades could not be opened or closed.

When one is ready to remove the instrument the blades are brought tightly together, the beak is turned to the median line and upward and the instrument is removed with extreme gentleness.

As the air distended bladder is well observed under the fluoroscope, it is always possible to see whether the beak is pulling the bladder mucosa. After the lithrotrite is removed, the evacuating apparatus is inserted at this sitting. The crushed particles are removed and the cystoscopic rongeur is inserted for observation, and for removal of particles that were not removed with the evacuator.

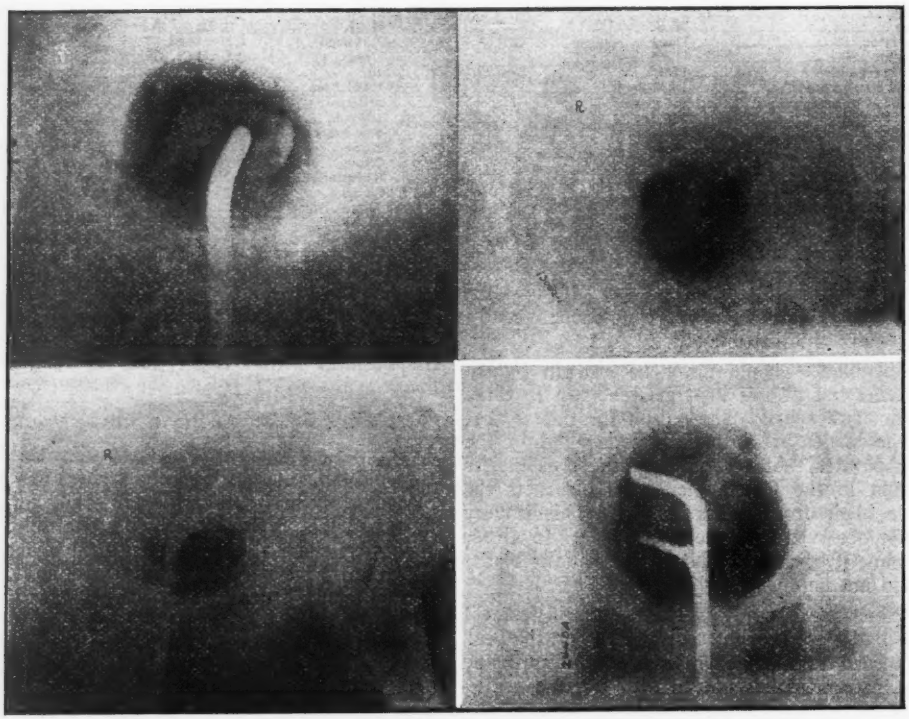
A No. 24 French catheter is inserted into the bladder. To avoid any unnecessary infection, it is advisable to inject about two ounces (60 c.c.) of some antiseptic solution into the bladder. The patient is returned to bed and allowed to leave the hospital within twenty-four to forty-eight hours.

ROENTGENOLOGIC TECHNIC AND EXPOSURE

The patient is placed on the horizontal fluoroscopic table on which a rubber sheet has been placed. Any horizontal table will suffice for this purpose. The fluoroscopic box is controlled by a shutter which allows only the field under observation to be exposed and also acts as a protection for the patient. Either the self rectifying 30 milliampere fine focus tube or the regular fine focus tube may be used. Every precaution is taken both for the patient and for the operator. In order to avoid any injury that may result from the effects of the rays, the operators use leaded rubber gloves and aprons of the same material. The table has an aluminum top which acts as a filter. Five milliamperes of current and 5 inch spark gap we find is satisfactory. The distance from table top to the target of the tube in our case is 15 inches. We also use a filter. According to our arrangements, we are permitted to give the patient a total exposure of at least 10 minutes. This time will have to be calculated according to the table used, as the focal skin distance varies. The current is not allowed to pass continuously. Only that degree of exposure is

TABLE 4.—DETAILS AND RESULTS

Case	4	5	6
Name	H. J. M.	M. J.	E. L. F.
Evacuator	Yes	Yes	Yes
Rongeur	Yes	Yes	Yes
Number of large pieces removed	10	8	7
Size of largest piece	1.4x1.2 cm.	1.2x1 cm.	1.2x1.1 cm.
Weight of pieces removed	450 grains	680 grains	620 grains
Amount of air	350 c.c.	125 c.c.	250 c.c.
Catheter drainage	Yes	Yes	Yes
Hemorrhage	None	None	None
Accidents	None	Unable to close blades	None
Incontinence	None	None	None
Residual before operation	15 c.c.	30 c.c.	20 c.c.
Residual urine after operation	None	10 c.c.	10 c.c.
Complications	None	None	None
P. O. Cyst	Normal bladder	Small median lobe	Small median lobe
Mortality	0	0	0
Results	Cured	Cured	Cured



Top Left—Case 3, Fig. 1. Lithotrite closed. Three calculi in bladder.
Top Right—Case 3, Fig. 2. Lithotrite grasping stone as seen under the fluoroscope.
Lower Left—Case 3, Fig. 3. Crushed fragments after operation as seen under the fluoroscope.
Lower Right—Case 4. Lithotrite grasping stone as seen under the fluoroscope.

given for the operator to see the calculi, grasp and crush them, or to ascertain his bearings.

In our small series, no patient has had more than a total exposure of eight minutes, with a minimum of four minutes.

ANESTHESIA EMPLOYED

It is advisable to use an anesthetic of some form, as the mucous membrane of the urethra and bladder in all these patients is very sensitive. If a local anesthetic is used, 3 ounces (90 c. c.) of a 5 per cent procain solution should be injected into the anterior and posterior urethra, and also the bladder. A Dakin syringe is used for injecting in the urethra and through the catheter for the bladder. The solution is allowed to remain fifteen minutes before the lithotrite is introduced. With this, a fair anesthesia is produced, at least sufficient to keep the patient fairly quiet. The best anesthetic effect was obtained when sacral or spinal anesthesia was employed.

ADVANTAGES OF NEW METHOD

The advantages of the new method may be thus enumerated:

(1) The operation is performed under the direct observation of the eye.

(2) The time of operation is greatly reduced.

(3) The possibilities of accidents are nil.

(4) Stones of large size can be crushed.

(5) No hemorrhages or trauma result.

THE CONTRADICTIONS FOR LITHOLAPAXY

Irrespective of the method employed, the contraindications remain the same, and are as follows:

(1) For a calculus in a diverticulum, an open operation should be performed.

(2) Again, for a calculus with an enlarged prostate, an open operation should be resorted to, the calculus being removed at the time of

prostatectomy. If the patient should object to an open operation, or if it is questionable whether most of the disturbance is caused by the calculus or prostate then the calculus first should be crushed.

(3) A calculus in the presence of a urethral stricture should be treated after the stricture is dilated.

(4) Should a calculus be so large as not to allow the blades of the lithotrite to be opened, then litholapaxy should not be resorted to. This can be determined best after an examination under the fluoroscope.

(5) A calculus in the presence of a neoplasm should not be treated by litholapaxy.

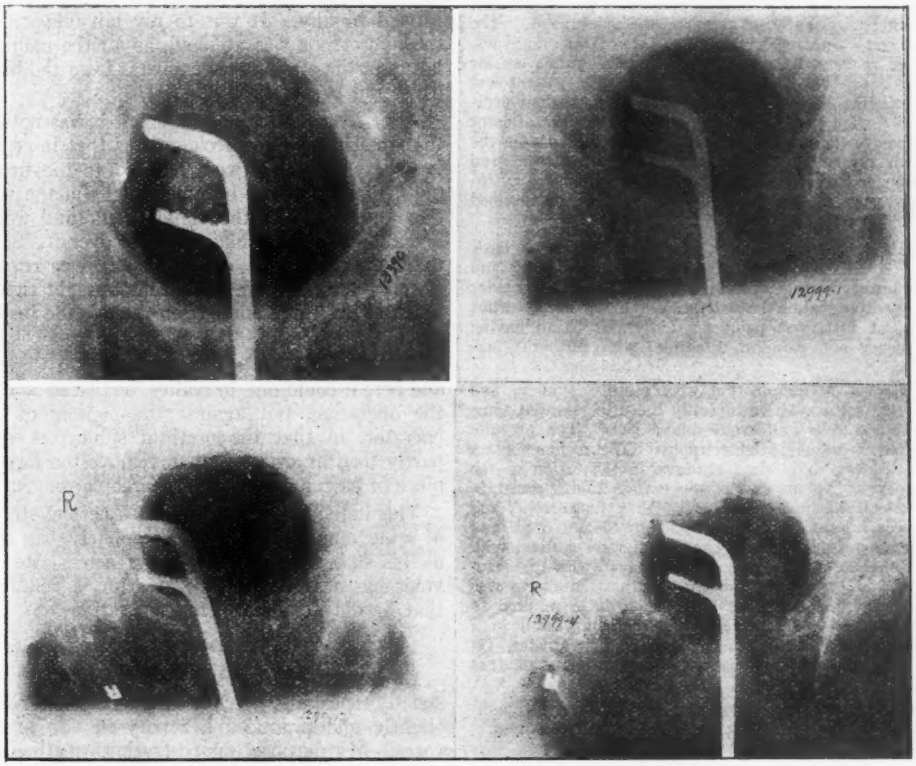
CASE REPORTS

The first three cases were reported in detail in our original article.[15]

Abstracts of the three additional cases are as follows:

Case IV.—A man 50 years old, a farmer, complained of pain in the perineum. He had a positive history of tuberculosis in the family with a past history of passing some small calculi two years prior to my examination. His present complaint was that he had noticed some blood in his urine on several occasions. This was accompanied by frequency of urination during the day and night, and burning and straining on urination with severe pain in the perineum.

The examination showed many pus cells and some red blood cells in the urine. The external genitalia were normal, and the prostate was normal. X-ray revealed a large shadow in the region of the bladder which on cystoscopy was diagnosed as a large vesicle calculus. The bladder was examined with a fluoroscope after injecting air, making the calculus very visible. The usual procedure as described was carried out, the calculus was crushed and the particles were removed with the evacuator and cystoscopic rongeur. Catheter drainage was established for two days. No hemorrhage resulting, the catheter was removed and on the third day



Top Left—Case 1. Lithotrite grasping a stone as seen under the fluoroscope.
Top Right—Case 2, Fig. 1. Lithotrite grasping a stone.
Lower Left—Case 2, Fig. 2. Lithotrite grasping a stone in a different position.
Lower Right—Case 2, Fig. 3. Crushed fragments as seen under the fluoroscope.

the patient was discharged as cured, and a subsequent cystoscopic examination revealed the bladder to be normal.

Case V.—A very stout man weighing 290 pounds, asthmatic in type, age 60, complained of pain at the end of his penis, with urinary difficulty. His family and past history were negative. He claimed that the onset of his trouble began about one and one-half years previously with frequency of urination, principally during day, and with pain at the end of his penis. Occasionally he had noticed blood in his urine. His urinary symptoms had recently become aggravated, causing him a great deal of discomfort. The positive findings in the examination were many red blood cells and some white blood cells in the urine. Albumin was positive, and sugar negative. Digital examination of the rectum revealed a moderate hypertrophy of the prostate. Roentgenogram revealed a large dense shadow in the region of the bladder. Cystoscopically there was 30 c. c. of residual urine, a very small beginning median lobe and a very large calculus. The patient was examined with the fluoroscope after injecting air into the bladder, employing the usual procedure under sacral anesthesia. The calculus was crushed with the lithotrite. It was in this case, as was mentioned in the tables, that the accident occurred in which the blades could not be brought together sufficiently to remove the instrument. The fragments were removed with the evacuator and cystoscopic rongeur. Catheter drainage was employed for three days. No hemorrhage resulted. The patient was kept in the hospital for a few days longer than ordinarily owing to the irritation produced by the attempt to remove the lithotrite after it became locked. On the eighth day he was feeling well, passing urine in a good stream and was discharged cured. A subsequent cystoscopy, two months after he was discharged, revealed his bladder to be normal.

Case VI.—A white man, age 61, retired from business, complained of bladder trouble. His family and past history were essentially negative. Four weeks prior to my examination he had noticed blood in his urine. This, at first, was painless. Later, he began having frequency and pain on urination, with further hematuria.

Findings on examination were positive albumin and negative sugar. Microscopically the urine showed some red blood cells and white blood cells. The prostate showed a beginning hypertrophy. The roentgenogram revealed two good sized shadows in the region of the bladder which, on cystoscopic examination, proved to be calculi. He was examined with a fluoroscope, and air was injected into the bladder in the usual method under sacral anesthesia. The calculi were crushed with the lithotrite and the fragments removed with the evacuator and cystoscopic rongeur. Catheter drainage was established for two days. No hemorrhage resulted so the catheter was removed. The patient voided in a good stream following the removal of the catheter. On the fifth day he was discharged from the hospital as cured.

A subsequent cystoscopy three months after the operation revealed the bladder to be in normal condition.

RESULTS

A study of the accompanying tables reveals the various important data that concern a new operation of this type.

The results up to the present have been gratifying, but owing to the small series of cases (six) one is not justified in saying that it is infallible. Some accidents have occurred which by experience can be eliminated.

In this small series I can report one accident, one complication, no mortality, and 100 per cent cures.

The accident that occurred was in Case V. After the calculi were crushed to a fine pulp and small pieces and the lithotrite was in readiness to be removed, it was observed through the fluoroscope that the blades would not come together. They remained 1 centimeter apart, too large to remove through the urethra. After manipulating with plyers and monkey wrenches on the outside the blades were finally brought together and the instrument was removed without any damage. This, of course, was through no fault of the operation. The same thing could have occurred if the operation had been performed blindly. It was to my advantage that the fluoroscope was at hand, as all the manipulating in the attempt to remove it from the bladder could be observed.

After removal of the instrument it was noticed that the cause of the accident was that in crushing the stones they were reduced to too fine a pulp, some of which became caught in the window and groove of the female blade and would not allow the male blade to ride over it. Since this has occurred the operation has been revised in that the blades are at no time brought tightly together until one is ready to remove the instrument.

The complication encountered was in Case II and here it could not, in reality, be placed against the operation, but against the technic of the operator, in that the urethral sphincters were partly torn in an attempt to remove too large a piece of calculus with the cystoscopic rongeur.

This individual at present has a perfect stream of urine, empies his bladder completely, can shut off his stream at will, but nevertheless after he voids has a mild dribbling of urine, a condition that he did not have before operation.

COMMENT

In this series of cases I did not confine myself, strictly speaking, to litholapaxy, but deviated slightly and practiced lithotrity in two of the cases. My purpose was to try both methods.

To avoid any roentgen ray burns, we advise that the maximum amount of actual exposure to the rays should not be over ten minutes at one sitting. If any difficulty should arise in crush-

ing all the stones in that time (and it should not), it would be advisable to have the patient return for another sitting after not less than two weeks.

The rapidity with which the actual crushing of the stones can be performed gives one the assurance that no fear of a roentgen ray burn need present itself. We advise an intermittent exposure. The duration of the operation may be extended at will, but the actual crushing of the stones should be performed as speedily as possible. In order that the eyes may accommodate themselves to darkness, it is well to wear colored glasses or remain in a dark room for at least ten minutes before beginning.

Various media for contrast shadows in the bladder have been tried. In my experience, air has proved the best. The air is not completely expelled from the bladder before thirty to forty-five minutes. All the patients were over 60 years of age. This, with the fact that two of them had previous suprapubic prostatectomies, made me feel that they were not the best subjects for another open operation. Case III certainly demonstrated to me that the operation is ideal, in that a blind litholapaxy was attempted on seven different occasions.

The best and safest results have been obtained by the use of sacral anesthesia.

Should the crushed fragments obstruct the manipulations of the lithotrite in a case of more than one calculus, then the fragments can be removed. To do this a re-insertion of the lithotrite is necessary. In these cases all the crushing was done at one sitting without re-inserting the lithrotrite.

The actual number of days spent in the hospital is far below the number with the open operation for stone (Table 1). The impunity with which this operation can be performed as to accidents and complications (Table 2), and the rapidity with which it can be done, should place litholapaxy on a higher and safer plane as an operation than it has ever been.

The excellent contrast shadows produced by the air and the calculus under the direct observation of the eye make it possible for the operation to be performed with greater confidence.

With the new procedure, the former fears and some of the disadvantages of performing lithotrity or litholapaxy should be dispelled, as at present it meets all the requirements of a perfect operation. The presence of a large external meatus, together with a good anesthetic, assists in giving perfect results. This method should not be employed unless the calculus will give a radiable shadow.

CONCLUSIONS

(1) Litholapaxy or lithotrity, combined with fluoroscopy of the bladder in an air medium, is an ideal operation for vesicle calculi.

(2) Litholapaxy with the technic advised should be the operation of choice in uncomplicated cases of vesicle calculi.

(3) The operation is always under the control of the eye, making it a rapid and safe procedure.

(4) Accidents and burns are negligible, if all precautions that are taken by a competent roentgenologist against x-ray dangers are carefully carried out.

(5) No attempt should be made at crushing if the calculus is small enough to remove with a lithotrite.

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330 N. Charles St.

DISCUSSION (Abstract)

Dr. G. E. Adkins, Jackson, Miss.—May I ask how the Doctor removed the pieces after the stone had been crushed?

Dr. H. E. Ashbury, Baltimore, Md.—While Dr. Goldstein was doing a blind litholapaxy some pieces of the stone obstructed the jaws of the instrument so that he could not close it, and it was in the effort to learn why he could not withdraw the instrument that he resorted to fluoroscopy. It happens often in life

that necessity is the mother of invention. He immediately realized that his idea was extremely practical. He has not had a single accident similar to the one which brought about the method originally. He has not had a single case of over-exposure because he has been extremely careful in the time of exposure. He uses a stop watch so that the exact time limit for using the fluoroscope is not over stepped. He has had no experience with the electric burns that one may get in the use of an x-ray apparatus. The idea is extremely practical for the urologist working in conjunction with the roentgenologist. It would be impractical for the urologist to attempt to use the fluoroscopic instrument unassisted.

Dr. Goldstein (closing).—The fragments of stone which Dr. Adkins asked about, are removed with a cystoscopic rongeur, an instrument expecially made for this purpose. It can be introduced into the bladder with ease. The fragments are observed and grasped. The fragments which are too fine to be removed with the rongeur, are removed with the Bigelow evacuator which is quite simple, working as a suction apparatus. It would be ridiculous for a urologist to attempt the control of the fluoroscope without assistance.

As the urologist knows practically nothing about fluoroscopy, the work in the fluoroscopic room should remain in the hands of the roentgenologist. The roentgenologist should also advise the urologist when his time is up so as to eliminate possible ray burns, or other dangers. None of my patients has received an x-ray burn as I have carefully watched the time of exposure myself. The procedure is not quite so difficult as it may seem.

You can well imagine the difficulties of a urologist when litholapaxy is performed blindly. I have seen ruptures of the bladder on two occasions. Peritonitis resulted in both instances. One was recognized, the patient was operated upon and recovered. The other was not recognized and death resulted.

Now that we have this new and simplified method of performing litholapaxy we can realize how impossible the old, blind method was, with every probability of doing more damage to the bladder than originally existed.

We determine the capacity of the bladder with water on a previous occasion and we never continue to inject water after the patient complains of pain whether he has 100, 200 or 300 c.c. When I inject air, I inject a smaller quantity in order not to over-distend the bladder.

TRAUMATIC RUPTURE OF URINARY BLADDER: REPORT OF TWO CASES*

By CLAUDE G. HOFFMAN, M.D., F.A.C.S.,
Louisville, Ky.

The urinary bladder may be briefly described as a contractile, distensible, musculo-membranous, abdomino-pelvic hollow viscus, the anatomic and physiologic purpose of which is to receive and temporarily store urine excreted by the renal apparatus. It also assists in expelling the accumulated urine at intervals. In conformation it is pyriform, oval or elliptical, depending somewhat upon the age of the individual and the state of the viscus, i. e., whether is is partially or completely filled with urine. The average normal capacity is about 600 c. c., but it is capable of considerable distension. When empty it retracts into the pelvic cavity. When distended, its situation is partly abdominal. It is protected laterally by the pelvic bones, posteriorly by rectum and sacrum, and anteriorly(partially) by the symphysis pubis. No other abdomino-pelvic viscus enjoys the distinction of being so well safeguarded against injury from external trauma by bony surroundings.

Under the anatomic circumstances just described, theoretically at least, vesical rupture would appear impossible except by external trauma of sufficient gravity literally to crush the bony pelvis. Practically, however, the viscus may be ruptured by traumatic agencies externally applied without the production of serious damage to surrounding structures. Moreover, spontaneous rupture has been known to occur from overdistension where urinary obstruction suddenly became complete, and also during stupor from intoxication. In the majority of instances, however, rupture is produced by external violence and adjacent structures are injured to a greater or lesser extent by the traumatic agency whatever it may be.

In character the rupture may be: (a) extraperitoneal, (b) intraperitoneal, or (c) subperitoneal. In the latter (rare) case only the mucous and muscular coats are involved. The site, size and type of the rupture will depend largely upon the causative factor and state of the viscus at the time, i. e., whether it is empty or distended. The anterior and fundal walls are the most frequent sites of rupture.

Traumatic rupture of the urinary bladder is not a very common accident. It occurs with greater frequency in males than females, and is most common between the ages of 20 and 50, the reasons for which are obvious. It is rare in children, although several such cases have been recorded in the literature, and one of my personal cases occurred in a boy of ten years. In a small percentage of instances there may be no history or recollection of trauma. As already suggested the accident has happened during profound intoxication, when urination was neglected because of stupor and reflex inactivity, rupture being due to the overdistension thus permitted.

*Read in Section on Urology, Southern Medical Association, Eighteenth Annual Meeting, New Orleans, La., Nov. 24-27, 1924.

Vesical pathology, when present, is an important predisposing cause.

The actual determining factor is usually external violence. Blows or kicks upon the lower abdomen; crushing injuries by wheels of heavy automobiles or other vehicles passing over the body; impact of an approaching solid object while the individual is immovably fixed; railway accidents, street car and automobile collisions; falls upon the feet, buttocks or abdomen; strain incident to lifting heavy weights; violent straining during defecation, urination, parturition, etc., have all been mentioned as determining causes. Rupture has also been produced by careless and unwarranted instrumentation, and from overdistension by the injection of fluids.

Traumatic rupture of the urinary bladder, regardless of the manner of its causation, represents an accident pregnant with clinical dangers. For reasons well understood the intraperitoneal type is attended by greater danger than the extraperitoneal. The former is also much more frequent than the latter.

The early general symptoms upon which the observer must depend for clinical diagnosis are: The history of injury, varying degrees of shock, lower abdominal pain, muscular rigidity, tenderness; sometimes vomiting, distension, signs of internal hemorrhage; dysuria with constant desire to urinate and unproductive straining or the expulsion of a small quantity of blood-stained urine. Most important is the history of external trauma and the manner of its infliction. There is usually more or less injury of adjacent structures.

Catheterization may disclose the vesical cavity empty, or partially filled with bloody urine, depending upon the location and extent of the rupture. Cases have been reported where the catheter, passing through the artificial opening in the vesical wall, withdrew immense quantities of blood-stained urine from the peritoneal cavity, thus temporarily obscuring the diagnosis. Symptoms indicating peritoneal irritation are generally noted within a few hours, provided intraperitoneal rupture with urinary leakage has occurred.

The local signs vary according to the site and character of the lesion. Violent prevesical pain, with swelling and dullness over the symphysis pubis, are usually noted in extraperitoneal rupture. Urinary infiltration into the adjacent tissues soon becomes maninfest with the production of characteristic phenomena. In intraperitoneal rupture the local signs are necessarily peritonitic in character.

When local and general manifestations are considered insufficient upon which to base a positive early clinical diagnosis, and vesical rupture is strongly suspected, exploratory suprapubic incision is justifiable for diagnostic purposes. In the event inspection of the prevesical space discloses no evidence of an extraperitoneal lesion, the peritoneum may then be incised if necessary and diligent search may be made for intraperitoneal rupture. At first thought this plan may appear radical, but it is much safer than to procrastinate and make further attempts to verify the provisional clinical diagnosis by injecting fluid to distend the vesical cavity. Fatal peritonitis has quickly followed the introduction of infectious material with distending fluids, and also from repeated catheterization and cystoscopy, during the interval of diagnostic uncertainty. Delay entails greater clinical risk than carefully executed surgical exploration. This statement will apply irrespective of the site or extent of the rupture, provided it be sufficient to permit the escape of urine.

The therapeusis of traumatic rupture of the urinary bladder, regardless of its cause, is usually surgical. In the greater number of cases temporization with conservative or medical methods of management is merely courting disaster and inviting fatality. This applies to every case where the clinical diagnosis seems reasonably certain, irrespective of external trauma or the severity of the symptoms presented. It must be remembered that serious internal damage may result from trauma with slight external evidence; also that extensive external damage may be inflicted without producing internal injury. It is therefore imperative that every patient suspected of having internal injury be promptly and carefully studied to insure a reasonable degree of diagnostic accuracy and to fortify surgical judgment. In rare instances where recovery has been reported following non-surgical treatment of supposed visceral rupture, the diagnosis must remain doubtful. If rupture actually existed evidently no leakage occurred, otherwise fatality would have been the most probable outcome.

In rupture of the urinary bladder surgical delay awaiting the appearance of typical or classical clinical signs, usually means that when such symptoms are recognized and operation is performed, fatality is inevitable. Early surgical intervention generally means the conservation of human life. These facts are well illustrated by mortality statistics in late operations a few decades ago, when it was considered unjustifiable to invade the peritoneal cavity until the indica-

tions became certain and absolute. For example, prior to 1879 the death rate in intraperitoneal rupture was 99.2 per cent; in extraperitoneal 22 per cent (Cabot). In more recent years, since it has become well understood that the peritoneum may be surgically invaded without very much danger, the mortality rate has been gradually lessened. It is now believed that the death rate in vesical rupture, promptly and adequately treated according to modern surgical principles should be no greater than from abdominal section for other lesions. Early operation is imperative, since the chance of recovery decreases in proportion to the interval between injury and intervention. In extraperitoneal rupture peritoneal incision is unnecessary.

The operative technic is simple and has been practically standardized. It consists of a suprapubic incision; removal of detritus, urine, blood, foreign material, etc., from the prevesical space or peritoneal cavity; suture of the vesical lesion; drainage of the prevesical space or vesical cavity as indicated; and the use of an indwelling catheter where required.

Only two of the several cases of vesical rupture which have come under my personal observation have been selected for detailed report. Each case is of interest especially on account of the causative factor.

CASE REPORTS

Case I.—M. B., a boy, aged 10 years, was caught between a moving street car and the door of the car barn, sustaining a fracture of the right radius, the nose, and the tip of the coccyx. According to the history no urine was voided after the accident. When he was seen twenty-four hours later he had acute urinary retention, the bladder being greatly distended. It was impossible to introduce a catheter or even a filiform bougie. He complained of severe lower abdominal pain, and muscular rigidity was extreme. His temperature was not taken.

The patient was immediately removed to the hospital. A low suprapubic incision disclosed an extraperitoneal rupture of the anterior vesical wall extending through the neck of the viscus. There was a large amount of bloody urine in the space of Retzius. Examination of the exposed bladder interior showed no intraperitoneal injury, and the peritoneum was not incised.

After removing all the debris the vesical opening was sutured with catgut and the space of Retzius was drained. Bladder drainage was secured by inserting a tube through a puncture wound high on the anterior surface near the peritoneal reflection. An attempt to introduce a catheter after operation resulted in failure. However, seven days later a No. 12 catheter was inserted, and the suprabubic tube was then removed. Drainage by indwelling catheter was continued for nearly two weeks.

The temperature ranged between 100 and 102° F. for five days following operation and then subsided to normal. Recovery was otherwise without incident. Dilatation was necessary, however, at intervals during the next two years to overcome contraction of scar tissue at the vesical neck. In the meantime the patient had four or five attacks of acute urinary retention, probably caused by bicycle riding, which were relieved by catheterization. He has since remained perfectly well.

Case II.—C. G., a male, aged 43 years, while carrying a heavy timber on his shoulder, slipped on the ice and fell on his buttocks, sustaining an extraperitoneal rupture of the anterior vesical wall. He was admitted to the hospital as an emergency case for immediate operation. Palpation revealed a moderately distended bladder. A catheter was introduced, after some difficulty, and a large amount of bloody urine was withdrawn.

A low suprapubic incision was made, the blood clot and debris removed from the space of Retzius, and the vesical opening was sutured as in the preceding case. Examination disclosed no intraperitoneal rupture. The space of Retzius was drained in the usual manner, and bladder drainage secured by inserting a tube through a high puncture wound. On the fourth day an indwelling catheter was inserted and the suprapubic tube removed.

On the day following operation the temperature rose to 101° F. but subsided to normal on the fifth day. The patient made an uneventful recovery and was dismissed from hospital in three weeks.

Francis Building.

DISCUSSION (Abstract)

Dr. George R. Livermore, Memphis, Tenn.—There is one point in diagnosis which Dr. Hoffman did not mention: that is the injection of air into the bladder to determine whether the rupture is intra- or extraperitoneal, after the Vaughan and Rudnick method. A catheter is passed into the bladder per urethram, air is injected and an x-ray is made. If the rupture is intraperitoneal, the air passes upward between the intestines and outer abdominal wall and collects under the diaphragm. If it is extraperitoneal, the air is seen in the perivesicular spaces outside of the peritoneal cavity.

Drainage is very important in these cases and downhill drainage is better than uphill. Therefore, I prefer the method of Chute which consists in making a small incision in the perineum. A forceps is then pushed downward from above through the incision in the perineum, and a rubber drainage tube is grasped in the forceps and pulled back to the perivesicle space near the rupture.

I recently had a case of complete rupture of the membranous urethra with extravasation of urine following fracture of the pelvis. The severed bladder neck fell downward and when the finger was introduced through the external urethrotomy wound, no bladder neck could be felt. Passing the finger backward toward the rectum the severed bladder neck was located and brought into proper position. A wire stylet was then passed through the external urethrotomy wound and guided by the finger on into the bladder. A drainage tube was then threaded over the stylet and on into the bladder, thus bringing the severed urethra and bladder neck in apposition.

Dr. H. W. E. Walther, New Orleans, La.—I have observed but three cases of bladder rupture, two complete

and one incomplete. Both complete ruptures occurred in firemen, who, in jumping fell upon the buttocks with full bladders.

In both cases hematuria and suprapubic extravasation made their appearance promptly and the diagnosis was easy. The incomplete rupture occurred in a lady of 60 years who had sustained a fracture of the hip in an automobile accident, was attended by an orthopedic surgeon, and the hematuria was not discovered until a week after accident. Cystoscopy revealed a tear in the mucosa and submucosa, about an inch long, filled with clot. Local treatment was followed with recovery.

Dr. W. J. Wallace, Oklahoma City, Okla.—I would like to report briefly two cases.

The first case was a colored man, about 34 years of age, who was brought into a small hospital in this city and transferred to my service. He said that he had fallen from the top of a wagon and a sack of cotton seed had fallen on top of him. At that time no particular discomfort was felt, so he was able to deliver his load of seed. But the pain grew worse, he was admitted to the hospital thirty-six hours later and when I saw him it was something about fifty hours later. He was unable to void and was in considerable distress.

At my first examination I did not recognize his trouble. Catheter was passed with some difficulty and a little bloody urine came through. I attempted to irrigate his bladder. The water passed without returning, the patient began to complain of pain deep in his abdomen, up near the diaphragm, and I immediately recognized an intra-abdominal rupture. After operation, the patient was placed in the Fowler position and made an uneventful recovery.

The second case was a boy aged 16 years, who was herding cattle. He tried to make his horse jump a ditch, but the horse fell and the young man struck the saddle pommel. He detected no particular pain at that time but that night had trouble in voiding. His home physician was called, who catheterized and drew considerable amount of urine with practically no blood, macroscopically, at least. This had to be repeated the following morning, and at that time the patient was sent to Oklahoma City and came under my care.

Examination revealed a slight thickening over the suprapubic region corresponding to the space of Retzius but there was no marked evidence of extravasation. Cystotomy was made, and a slight abrasion was located just underneath corresponding to the external bulging. An indwelling catheter was placed. He had no discomfort for several days. The thickening gradually subsided and I permitted him to return home.

After returning to his home, during a scuffling match, he had a fall which produced a recurrence of the trouble. He was returned to the hospital and tumefaction was rather pronounced.

I made an incision as we do for cystotomy. The fistulous tract was closed, a drain tube placed in the space of Retzius, an indwelling catheter placed and the boy made a rapid recovery.

Dr. C. W. Shropshire, Birmingham, Ala.—I have had two or three cases in which I have tried air filling, taking the picture with the patient on his back and on his side, which has been very satisfactory.

I had a case not long ago, a man who was badly shocked, and I did a suprapubic cystotomy under a local anesthetic. I did not repair the rupture in the bladder, but left a drainage tube of about an inch and a half, or two inches in diameter. He cleared up without any trouble at all. In fact, he cleared up as well as those cases in which the rupture in the bladder had been sutured.

Since that time I have had three or four cases. I made my incision in the bladder low down, put in a large drainage tube and did not attempt to repair the rent, but carried a drain into the prevesical space. You can get the patient off the table more quickly by this method. This is important for they are profoundly shocked.

Dr. Louis Frank, Louisville, Ky.—The last speaker was probably not dealing with true rupture of the bladder. I think the essay has to deal with rupture of the bladder. When we have infected urine extravasated as a result of stricture, we have quite a different condition from that which comes on suddenly, following an injury, where as a rule the urine is uninfected.

It has occurred to me, though I have never followed it out, that a ready way to diagnose these things would be to inject some sterile sodium bromid solution, instead of air, and observe the patient under the fluoroscope during the time the fluid was being put in. Thus you could diagnose precisely the point of rupture, and no harm would be done even if the rupture were intraperitoneal.

There are conditions in which rupture of the bladder may take place where neither the injection of air nor any other material would enable you to make a diagnosis.

In this day of a great number of automobile accidents, this is an injury which should never be lost sight of, and I believe after every such accident it is well to catheterize the patient's bladder.

Where sudden transmitted force is applied, such as we get from dropping from a height, or from an automobile's sudden stopping, we are apt to have an intraperitoneal rupture if the bladder is full. Where we have a crushing injury, which involves the pelvic bones, the rupture is apt to be below the peritoneum.

A case that I have in mind followed an automobile accident. The individual with a full bladder had an intraperitoneal rupture. No operation was done until fifteen or eighteen hours afterward, the injury being suspected on account of the beginning of peritoneal pain and discomfort. The bladder was catheterized and the urine came away clear. His bladder was washed out, the water came back, and yet we believed that he had some intra-abdominal injury and opened his abdomen. He had a very large rupture of the bladder and just at the moment of escape of the urine a loop of gut had been projected into the rent, and had prevented the escape of the fluid introduced for washing, and the mixture of the urine with blood, had also enabled him to void regularly.

This wound was treated, after incision, by extraperitonealizing the rent. The man made a good recovery.

Dr. A. Goldstein, Baltimore, Md.—Following an abdominal operation, a patient failed to void for 24 hours. A catheter was introduced into the bladder, no urine was obtained and if I recall correctly, the patient died forty-eight hours after the introduction of the catheter. An autopsy was performed, the bladder was taken out intact and the catheter had gone through the bladder and the peritoneum.

At the time of the autopsy the operator believed that there was an ulceration in the bladder which ruptured and the catheter happened to slip through, but personally, I do not think that was the way the accident occurred. I think it was a rupture of the bladder with the catheter. This was a unique case.

Had air been injected through the catheter for diagnosis, it would have been a great help, for reopening of the wound would have disclosed the rupture and recovery might have resulted.

Dr. A. T. Folsom, Dallas, Tex.—I saw a man about 45 years of age, five feet six or seven inches tall, weighing about 285 or 300 pounds. He came in with a bladder history extending over a number of years. A cystoscopy in the office was impossible. I could not get into the sacrum, so we gave him a general anesthetic, and I did a chromo-cystoscopy, to visualize the urine.

The bladder was badly contracted, ulcerated in several places, and I was never able to locate but one of the uretheral openings by the color of the urine coming through it. The operation was completed, the patient was sent back to bed, and at that time I had no suspicion that the rupture had occurred and it is questionable whether it did occur at that time. The man died in forty-eight hours, and an autopsy revealed the fact that he did have several ulcerations, rather deep in the bladder wall and there was one that was particularly deep, and this was ruptured, which produced the peritonitis, which killed the man.

One of the kidneys was tuberculous. We should keep the possibility of rupture constantly in mind in cystoscoping cases where we have to use a general anesthetic, and we have an ulcerated bladder. We should try to avoid overdistending the bladder in these cases.

Dr. Hoffman, (closing).—In vesical rupture the patient is usually in profound shock when first observed by the urologist, and immediate operation is the safest plan. Delay incident to repeated cystoscopy or catheterization greatly increases the clinical risk. In both cases included in my paper pre-operative instrumentation was futile. The child was in profound shock, he had urinary retention, catheterization was impossible, and immediate relief was imperative.

I agree with Dr. Livermore in regard to drainage; but even after relief has been obtained by suprapubic cystotomy, the patient is still in shock, and it hardly seems advisable to prolong the anesthetic and operation sufficiently to perform perineal section for additional drainage.

In vesical rupture from over-distension due to urethral stricture, there is generally co-incident rupture of the urethra proximal to the strictured area. These are complicated cases, and the results of treatment are not always satisfactory.

Injecting air into a ruptured urinary bladder is just as dangerous as introducing distending fluids. It does not matter whether rupture is intra- or extra-peritoneal. In either event infectious material may be introduced followed by disastrous results. As a rule the patient must be operated upon anyhow, the more quickly you go in and come out the better for all concerned.

PERPENDICULAR INCISION AS A UNIFORM APPROACH IN BOTH INGUINAL AND FEMORAL HERNIORRHAPHY

By ANDRE B. CARNEY, B.S., M.D.,
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In lieu of the many incisions advanced in the past, one naturally feels a hesitancy in advocating a new method of approach in hernia repair, though the success I have met with in the use of this incision and the ease through which the parts to be repaired can be reached have caused me practically to abandon the always popular Poupart's incision in favor of the one noted above.

This incision is not original with me. The credit belongs to Dr. Walter M. Silleck of New York City, who was visiting surgeon at Harlem Hospital during the time I was house surgeon at that institution. Together we performed a number of operations, using the technic which I shall describe below. And from our series of cases I was so favorably impressed, that I have continued using the incision in my work since that time.

The customary incision slightly above and parallel to Poupart's ligament gives a nice exposure in practically every case, but there are certain cases of obese or even moderately obese individuals, in which the incision I shall describe below seems to offer definite advantage.

The incision which I advocate is 3 to 5 inches in length, as the individual case may demand, parallel to and about 2½ inches from the midline of the body. The upper end of the incision is on a line with or slightly below the level of the anterior superior illiac spines; and the lower end crosses Poupart's at the junction of the middle and lower third of the ligament. This gives a free exposure of the conjoined tendon and external oblique fibers. By slightly undermining the lower border of the inner flap the spermatic cord can be picked up. Now by undermining the outer flap the fibers of the exterior oblique can be exposed to any desired extent. The incision is such that Poupart's is exposed without undue traction and the necessary repair is completed as easily as in the customary incision. Using the same incision, with Pouparts readily exposed, it is an easy matter to do an inner repair for a femoral hernia. In fact, the exposure is better, I believe, than in the customary incision.

We are not only able from a perpendicular incision easily to expose Poupart's ligament, but if necessary, can easily bring the fascia of the rectus across to aid in repair in those few cases of direct hernia associated with laxity of the lower abdominal wall. These cases are the exception rather than the rule though it serves to show that the incision is one of two-fold advantage serving equally well in either case.

This incision also gives an added security during the period of convalescence in so far as the skin incision is not in the same plane as that of the hernia repair. While we do not know that any material strength is derived from this, we are sure that the superficial wall has not been weakened. And should a skin infection occur, we have the added advantage that this is away from the repair proper.

While I do not think that the incision materially decreases the danger of infection in the region of the hair follicles, it can be safely said that the danger is no greater. The more abundant the hair follicles, the more prone the area is to infection and since the incision, unlike the Poupart incision, extends only through the outer edge of the pubic hairs, where they are fewer and more scattered, it stands to reason from a mechanical viewpoint that this danger would be decreased.

Another of the outstanding and more convenient advantages I find in using this incision is the matter of post-operative care. The dressing is easily maintained in place and the adhesive can be tightly and conveniently applied since the incision is in the same plane as in any abdominal operation in the lower quadrant.

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STRICTURE OF THE GALL BLADDER: CASE REPORT*

By CYRUS F. HORINE, M.D.,
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A white man, age 36, was admitted to the University Hospital Feb. 26, 1923, with the diagnosis of perforated gastric ulcer.

At operation I found a small contracted gall bladder with a definite constriction around the middle of the fundus. Examination of the hepatic and common ducts revealed no palpable stone. Because of the extreme pre-operative pain I was not certain of the absence of a stone in the common duct and, therefore, elected to do a cholecystostomy; but on opening the gall bladder I found this dense fibrous constriction dividing the gall bladder into two compartments each containing an impacted stone about the size and shape of a pigeon's egg. The constriction would not admit a Kelly clamp.

The gall bladder was resected below the constriction and the common duct drained through the cystic duct. Ten days following operation a small stone drained from the fistula.

The wound healed in five weeks and the patient was well eighteen months after operation.

I am reporting this case as a typical case of "hour glass" or "dumb bell" gall bladder. While many cases of hour-glass gall bladder have been reported I do not believe that organic stricture of the gall bladder is very commonly found, this being the only case in two thousand gall bladder cases reviewed in the University Clinic. Hour glass gall bladder is frequently found due to adhesions and physiological contractions. Many cases of dilitation of the pouch of Hartmann are mistaken for this condition.

Morton, Malcolm and Fowler have reported cases. Fowler in quoting W. C. MacCarty, of the Mayo Clinic, states that thirty-one cases of stricture were found in a series of 3,692 cases.

A study made by Else, in 1914, reports 24 cases in 1100 autopsies. Seven of these were found in babies varying from seven months intrauterine to one month after birth. Seventeen cases varied from one month to twenty-one years of age or over. Else gives the following classification:

Acquireds

(1) Destructive lesions beginning with the mucosa.
(2) Intramural infections.
(3) Pathological processes beginning with the serosa.
(4) Adhesions.
(5) Chronic indurative processes.
(6) Perforating wounds.

Congenitals

(1) Annular strictures.

(2) Those due to the projections of folds of the inner layers into the lumen. These usually occur in conjunction with the first or third type but, some times occur independently. These properly speaking are septa, but I have classified them here owing to their obstructing lumen.

(3) The fundus stricture or elbow deformity in which the fundus is folded upon the body of the gall bladder.

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*From the Department of Surgery, University of Maryland.

EYE, EAR, NOSE AND THROAT

THE PARANASAL SINUS AS A FOCUS OF INFECTION IN CHILDREN*

By EDWARD CLAY MITCHELL, M.D.,
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Because of our failure to locate a site of infection for many conditions in which we were certain there was a definite focus we began our study of the paranasal sinuses. Only recently have the general practitioner, the internist and the pediatrician routinely considered this condition in diagnosis. Even the most recent pediatric text contains little reference to it. We are very much indebted to Dean Skillen, La Mere and other rhinologists for their early work. Our study began four years ago following the influenza epidemic. We saw at that time children who did not recover promptly from the acute attack. Many of these patients had consulted the family physician for a condition entirely foreign to the nasopharyngeal tract. Particularly puzzling is the patient who complains of nasopharyngeal inflammation after removal of the tonsils and adenoids.

The ethmoid cells are present at birth but develop until puberty is well established and reflect in their growth the infections that they have suffered. The sphenoid is a distinct bony cell at birth, but has no clinical significance. From the age of three years the sphenoid sinus grows rapidly so that at the age of ten years it reaches the adult size. The frontal sinus is formed by the migration of the anterior ethmoid cells into the frontal bone and the presence or shape of the frontal sinus is governed by the migration of these cells. Disease of the ethmoid cells early in life will undoubtedly prevent this migration and thus determine the future development of the sinuses. We believe that early infection does inhibit the growth of the spheno-ethmoid labyrinth and does sometimes prevent the formation of the frontal sinuses entirely, producing what is known as the persistent infantile type of sinuses. These undeveloped sinuses react differently from the normal sinuses to infections occurring later in life, in that the infections tend toward chronicity.

In studying our cases we have recorded the physical examination, the report of the rhinologist, the laboratory findings, and the roentgenological study of the sinuses. Chest plates have also been made because of the frequent secondary involvement of heart and lungs.

In order to be able to interpret the findings in disease we must familiarize ourselves with the normal. We felt that the best method of determining the development of the sinuses as well as their disease, would be by careful comparative study of roentgenograms. We made roentgenograms of the sinuses and chests in fifty normal children from the age of ten days through puberty. Those who have made a roentgenological study in the infant and child will appreciate the difficulties we encountered because of our inability to keep the child patient quiet, also to obtain the same position in our series of plates on the same patient. We have adopted a technic as follows:

The position is similar to that described by Law. The patient is placed on the abdomen, chin and nose against the angle board. A small depression or mark is placed on the angle board for the nose position. Clamps are put on either side of the head. We use a voltage of one hundred milliamperes for one-tenth of a second. In this technic the shadow of the occiput is eliminated. Our findings in these normal cases were that the age of the patient could be fairly well determined by his sinus development. The radiographer will tell you that he finds many adults in whom the frontal shadow is entirely missing but he does not appreciate that early infection prevented their development. In addition to its value in determining the topography of our field, the roentgenogram is to be relied upon in determining the presence or absence of pus. In conjunction with the roentgenogram we have used transillumination. In some instances there have been definite shadows over the maxillary region with clear transillumination. Subsequent operation has shown the presence of pus. Transillumination we believe to be of positive value but it does not exclude inflammatory material in infants and young children. The roentgenogram is also of value in the future management of the case. It is our routine to take plates one month after treatment, six months, and then at intervals of six months, not only for the purpose of determining whether the inflammation is disappearing but also to see if the eradication of

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the infection is bringing about a normal sinus development.

We have treated one hundred and forty-five cases of paranasal sinus infection. In this series there was some involvement of the ethmoid in all instances. The ethmoid sinuses alone were infected in eighty-four cases, the sphenoid in two cases, both in children about the age of puberty. The frontal sinuses were involved in two instances though we found them often absent or overdeveloped. The maxillary sinus was involved in fifty-nine cases. Of these thirty-seven were surgical and twenty-two non-surgical.

The condition for which infections were sought are:

Return of adenoid symptoms	62
Chorea	10
Malnutrition or failure to gain	28
Functional heart	13
Bronchitis recurrent	23
Irregular temperature of unknown origin	11
Anemia	5
Arthritis deformans	1
Pyelitis	45
Asthma	18
Cyclic vomiting	2
Nephritis	15
Headache	3

Cases in which tonsils had been removed prior to treatment:

Under six months	3
Six months to one year	3
One year to two years	14
Two years to three years	30
Three years to four years	17
Four years to five years	20
Five years to six years	10
Six years to seven years	4
Seven years to eight years	1
Eight years to nine years	2
Nine years to ten years	2
Not removed	27
Found necessary to remove prior to sinus operation	14

The management of every case was first medical until we had proven this to be of no value, the medical treatment being both constitutional and local. The medical treatment consisted in the relief of the acute symptoms during the active stage. One-half a drachm of a solution of adrenalin, 1/1000, in three ounces of cocain solution, 0.25 per cent, may be used as a spray, to shrink the nasal mucous membrane, in this way reestablishing ventilation and drainage of the nares and the paranasal sinuses. Where the discharge is profuse, the use of some form of suction will expedite the drainage, and the discharge may be irrigated from the nares with a simple solution such as:

Sodium chlorid	ʒ vi
Sodium bicarbonate	ʒ vi
Menthol	gr. xviii

One-half teaspoonful to a glass of water as nasal irrigation.

Whenever the membranes have been irrigated, it is necessary to give them a protective emollient, and a 0.5 or 1 per cent phenol, in liquid albolene, combines the properties of a mild antiseptic and a soothing lotion. If there is need of a more powerful antiseptic, mercurochrome, two per cent, or neo-silvol, five per cent, may be instilled into the nares after the irrigation and before the oil. The use of mechanical means should not replace well established therapeutic agents, and a prescription containing

Sp. camphor	ʒss
Tr. beladonna	ʒj
Heroin	gr. ¼

Elix. aromatica, and aquae q.s. ʒiv

will lessen the nasal discharge. The acute cases will subside of themselves, but treatment will lessen the discomfort and lower the percentage of complications.

The treatment of chronic cases is both constitutional and local. Cod liver oil will aid calcium metabolism deposition. Heliotherapy will also be of value. The local treatment in the chronic cases differs from that used in the acute cases, in that the adrenalin-cocain mixture is not necessary unless the nasal congestion prevents sufficient suction and irrigation. The length of suction should be increased, as it serves a double purpose of withdrawing the discharge and acting as a pneumatic massage to the membrane. The irrigation should be thorough enough to wash away all the discharge present in the nares, and in this manner give the throat some relief from the postnasal drip. In the chronic cases, a more stimulating oily spray is used.

Menthol	gr. v
Camphor	gr. v
Eucalyptol	m xx
Liquid abolene	ʒii

Use in oil atomizer. This will stimulate the nasal membrane and is more delightful and will appeal to the child.

The treatment of the chronic cases should be continued long after the disappearance of the discharge. The use of an autogenous vaccine, made from the nasal discharge with or without the addition of the tonsillar infection, is a routine to increase the immunity of these children.

The surgical treatment consisted in free continuous drainage of the antrum when it was acting as a reservoir. This drainage must be as

thorough as drainage for any other pus cavity. We accomplish this by the insertion of a rubber tube into the antrum at the time of operation, the tubes being left in place until active drainage has stopped. The case should be kept under observation for a long period of time.

Observations.—In all of these one hundred and forty-five cases causes other than the sinuses were excluded. The non-operative cases were in the majority, for the average sinus case if obtained early was less firmly established and more readily controlled. The operative cases were subject to relapses when exposed to subsequent infections. No case was considered cured until three years had elapsed. The discharge obtained from the sinuses was cultured in all operative cases, the streptococcus being the predominating organism. In a few instances, particularly the nephritics, the Staphylococcus aureus was isolated in pure culture. In staphylococcus infections the autogenous vaccine was found to be of greater value than in streptococcus or mixed infection.

In six cases of the series there was tenderness over the sinus involved. In three cases only was headache the chief complaint. The nasal discharge was more abundant posteriorly than anteriorly. Cough on lying down was the frequent complaint and sneezing on arising was fairly constant. Intense nervousness particularly on examination was a fairly constant symptom. This symptom complex was so marked as to be a great aid in diagnosis. In some cases a child who had formerly been tractable and easy to manage became unmanageable. There seemed to be an entire change of disposition. Some of these patients developed a distinct chorea.

The tonsils had been removed previous to development of sinus infection in all but fourteen cases. In fourteen of the forty-one cases the tonsils and sinuses were found diseased on first examination. This would indicate that perhaps the sinuses are often diseased at the time of removal of the tonsils and adenoids and the temporary improvement that occurs is because drainage of the sinuses is promoted. We do not believe that removal of the tonsil increases the liability to sinus infection, but rather that the diseased tonsil is the original focus and is left *in situ* too long. The lymphoid child is subject to the various infections of the nasopharyngeal tract with its subsequent complications. Nasopharyngitis is often the first indication of a relapse due to the irritation of the sinus discharge.

CONCLUSIONS

(1) Paranasal infection comes to the internist and the pediatrician for diagnosis, in many instances showing no evidence or only minor signs of paranasal involvement, and is often overlooked.

(2) The roentgenogram is of value in the diagnosis if a definite technic is followed and considered in conjunction with other findings.

(3) Paranasal sinuses may be foci of infection in many conditions, even in the very young.

(4) The failure to recognize the presence of sinus infection at the time of removal of tonsils and the adenoids will lead to a recurrence of the symptoms for which the tonsils and the adenoids have been removed.

(5) The ethmoids were more frequently involved and next in frequency were the antra.

(6) The surgical cases while showing more definite immediate results require continued and complete drainage and watching for a period of years.

(7) No case is considered cured until the sinuses have begun to resume their normal development.

(8) In the past the sinuses of children were a forbidden field for surgery because of the mistaken impression that the surgery was responsible for the ravages produced by the infection.

CASE REPORTS

Case 5025.—E. S., age 11 years, was first examined Oct. 4, 1924. She had been ill three weeks previously with an attack of rheumatism, first in the knees and then the shoulder, later in the elbows and hands. The tonsils and adenoids were removed when she was four years of age. She had had measles, pertussis, chicken pox, frequent tonsillitis up to the time of removal of the tonsils, but had improved for several years after their removal. For the preceding two years she had lost weight, slept poorly at night and had frequent colds during the winter. She coughed on lying down at night and sneezed on arising in the morning. Physical examination showed an underweight, undernourished girl. The phalanges and metacarpals of the right hand were swollen and symmetrical in type. The swelling had subsided in the larger joints by this time. The temperature ranged from normal to 103°. The mucous membrane of the anterior nares was red and swollen. The turbinates were congested. The posterior nares was red and coated with a thick purulent discharge. There was slight reformation of the lymphoid tissue in the tonsil fossa. The roentgenogram showed a cloudiness of the ethmoids and an empyema of the antra. Transillumination was equally dark.

The blood count showed white blood cells 13,200; red 4,000,000; hemoglobin 80 per cent; polymorphonuclears, 62 per cent; large lymphocytes, 4; small lymphocytes, 35; and acidophils, 1 per cent. The

urinalysis showed six to twelve pus cells to the high power field.

Diagnosis.—There was double pansinusitis with a secondary arthritis and pyelitis.

Treatment.—Antrumotomy was done, and the reformed tissue of the tonsils and adenoids was removed. Culture of the antra showed Staphylococcus aureus from which an autogenous vaccine was made. Tubes were inserted in the antra and left in place one week.

Progress.—Fever was 103° after the operation and gradually subsided to normal in forty-eight hours. The swelling and pain increased for three to four days and subsided entirely in two weeks. An uneventful convalescence followed. The child gained in weight and attended school regularly. The urinalysis made Oct. 23, 1924, was normal. Subsequent roentgenograms taken Nov. 17, 1924, showed the antra clear.

Case 4446.—E. S., age 12 years, was first seen as an infant for diet regulation, because the mother was unable to nourish the child at her breast. She was normal and well nourished until three years of age, when she contracted acute follicular tonsillitis followed by bilateral otitis media and in turn by double mastoiditis. She was operated upon on both sides, and the adenoids were removed at this time. The following year the child had many attacks of tonsillitis and the tonsils were removed at the age of four years. The urinalysis showed forty to fifty pus cells to the high power field. Alkalin treatment was given and she was kept under observation for two years. She remained well until she was nine years of age when febrile attacks with no physical findings were reported. As she lived in the rural districts no urinalysis was made. She was seen one year previously by me after a rise of temperature which lasted for two weeks, which had been treated for malaria. The physical examination showed a fairly well nourished, though rather anemic, child of twelve years. The nasophrynx showed inflammatory changes, and a thick mucous discharge coated the postnasal wall. The roentgenogram showed a heavy shadow over the left maxillary sinus. The right sinus was slightly cloudy. The frontals resembled those of a child five or six years old. The ethmoids were cloudy. The chest plate showed enlargement of the heart shadow in all its diameters. Urinalysis showed five to six hundred pus cells to the high power field. The urine was acid, with a faint trace of albumin.

The diagnosis was empyema of the left antrum with secondary pyelitis.

Treatment was antrumotomy. The tubes were left in for seven days with washings at intervals for two months. A culture made from the sinus showed streptococcus. A vaccine was made but not given.

Alkalin treatment followed by urotropin was given. The urine cleared in two months, and has remained clear since. We have been unable to get the patient back for subsequent study.

Case 4030.—J. McD., 6 years old, was first seen at the age of four years. He was a well nourished child with a history of having had one or two attacks of tonsillitis. He was not seen again for one year. For two weeks previous to that time he had been having a septic temperature, ranging from 100-104°. He complained of pain over the right side in the region of the maxillary sinus, and some headache. The tonsils were red, swollen and enlarged. Ausculation of the chest showed a few scattered rales but no bronchial breathing. Roentgenograms showed cloudiness over both antra. The ethmoids were cloudy. Blood count showed white blood cells 21,800, with 75 per cent polymorphonuclears. The urinalysis showed a trace of albumin and from ten to fifteen pus cells to the high power field.

The diagnosis was tonsillitis, empyema of the antra, and acute pyelitis.

The child seemed to grow progressively worse under medical treatment so that a laryngologist advised that the tonsils be removed and sinuses drained the fourth day after admission to the hospital. The temperature at the time of the operation was 99°. Immediately following the operation it rose to 103°+. It remained high for twenty-four hours, then dropped to normal and remained there. The antra were drained and the tubes left in place for one week. A culture showed Staphylococcus aureus. An autogenous vaccine was made. There was no return of symptoms and the child gained in weight and strength. There was pus in the urine at intervals for two to three months but it is negative now. Roentgenograms made in July and September showed some improvement. The last plate showed the condition to be normal with considerable development of the frontal sinuses since operation.

Case 4161.—Bennett C. was 5 years old. His complaint began with frequent colds, loss of weight, and recurrent attacks of bronchitis with fever.

The child had been weaned from the breast when a very young infant, following a severe intestinal disturbance. Great difficulty was experienced in finding any food to agree with him. He was first seen by me at the age of fourteen months, when he weighed sixteen pounds. A wet nurse was resorted to before any improvement was shown, but after a short interval, with the breast and artificial food mixed, he became able to assimiliate his food and was on a normal diet, though he was still slightly under weight at the age of two years. He had been susceptible to colds from early infancy.

At the age of four years, following repeated attacks of tonsillitis, the tonsils and large, hypertrophied adenoids were removed. During the following six months he showed very marked improvement, then he began having very much the same symptoms that predominated before the operation. The members of his family suggested a second operation, as they were sure that the adenoids had returned.

About six months previously, at the beginning of the warm weather, be began to have frequent attacks of fever. Physical examination made at this time revealed that the nasal and pharyngeal mucous membrane was red and swollen, with a thick muco-purulent discharge from both anterior and posterior nares. He was also troubled very much at this time with coughing on lying down and sneezing on arising. The blood count showed a marked increase in the polynuclears with a leukocytosis. The roentgenogram showed a heavy shadow over both antra, with cloudy ethmoids. The consulting rhinologist suggested the use of medical treatment, as the hot weather was coming on which would be in the child's favor.

He improved somewhat until a cool spell in September, when he was kept in bed for one week with an attack of bronchitis. Physical examination, together with roentgenogram showed no change. If anything the shadow was a little more pronounced. Be-

cause the boy was in poor physical condition, he was removed to Biloxi after the acute symptoms had subsided. After being there three days he became entirely well so far as any symptoms were concerned. While in Biloxi for three weeks, he gained weight, had a normal temperature and felt well. Two days after his return home he had an attack similar to that previously described. Another roentgenogram showed the shadow even more dense, though transillumination was clear.

On the advice of the rhinologist, antrumotomy with drainage was instituted. A large amount of pus was obtained from both antra. The discharge obtained showed mixed staphylococcus and streptococcus on culture. After one week of drainage, fever subsided together with all signs of bronchial irritation. The appetite returned and the child is now gaining in weight. Six injections of autogenous vaccine were given. Local treatment, with calcium and cod liver oil, has been continued. A roentgenogram one month following the operation showed no improvement in the shadow, probably due to the fact that the local inflammation still persists.

Case 4025.—Courtney L., age 8 years, suffered from bronchial asthma.

He had been bottle fed from very early infancy, but had no trouble with his diet until he was over-fed on condensed milk, when he developed a severe case of intestinal intoxication. A wet nurse was resorted to before the digestion became normal. The mother stated that he had had two attacks of bronchitis in infancy with high fever during both attacks. She also stated that he had his first attack resembling bronchial asthma at the age of fifteen months, though his condition was not diagnosed by a physician until he was about two years of age. At that time she was told that his early dietary trouble had considerable bearing on the case, that the asthma was due to food sensitization, that it was necessary to remove all starches from his diet and to give him little sugar. On this diet he began losing weight with no improvement of the asthma.

At the age of three and one-half years, the tonsils and hypertrophied adenoids were removed. Shortly after this time he was taken to Las Vegas, New Mexico, where he was put back on full diet. He gained weight and remained well for six months, but on returning home, the attack returned.

At this time the mother was advised again to cut down the diet. This time the fat was also reduced, with a result similar to that of the previous year. They again returned to New Mexico, but this time the child did not improve. He was then moved up to Colorado Springs. The diet was put back to normal with improvement while there, but on his return to Memphis the following winter, the previous history was repeated. At the age of six yeas, he was still on a reduced diet and was having attacks of asthma every few weeks. At this time he was still considerably below weight.

The first examination of the nasopharynx was made at this time and showed a typically inflamed mucous membrane. The turbinates were enlarged and there were thick flakes on the mucous membrane of the nares, also a thick posterior nasal discharge. The tonsillar fossa was clean. There were no adenoids, though the child slept with his mouth open. The roentgenogram showed a shadow over both antra, though the floor to the antra could be clearly made out. The ethmoid shadow was increased. There was clear transillumination. The consulting rhinologist concurred in a diagnosis of ethmoiditis with slight involvement of the antra, although he did not consider it a surgical condition at this time. Medical treatment, consisting of suction, locally adrenalin-cocain mixture, followed by oil with frequent washings of the nares, was given. Calcium and cod liver oil were used, with ultra-violet rays. The discharge obtained by suction from the sinus showed on culture a mixed streptococcus and Staphylococcus aureus.

An autogenous vaccine was made and six injections were given. The child was kept off his feet, although he was allowed to lie out in the sunshine or be taken for a ride, for a period of one month. He was gradually put back on full diet.

During the first month following treatment there were two attacks of asthma. Afther this time there was no attack for three months. Following this there were no attacks for a period of six months at which time he was taken to a dog and pony show. The following night he had a severe attack of asthma, which entirely disappeared the following day. For the past eighteen months he has had no attacks, although during this time he has had both influenza and whooping cough. He is still on full diet and has gained several pounds in weight. A roentgenogram made one month ago showed the sinuses to be entirely cleared and that the frontals are developing normally.

Case 4275.—Ben B., age 9 years, had frequent bronchitis with fever. He was not gaining in weight..

He was given mixed feeding when an infant because the mother had insufficient milk. He developed normally with no intestinal trouble during infancy, although he had been subject to frequent colds since early infancy. When about three years old he had a severe spell of tonsillitis. There were several recurrences until he was four and one-half years old, when the tonsils, along with hypertrophied adenoids, were removed. His general health improved considerably for a period of two years. There were no attacks of bronchitis during this period. At the age of six years he developed a rather severe attack of influenza followed by bronchial pneumonia. Since this time he had had numerous attacks of bronchitis, had been very nervous, and did not play well with other children. He had severe spells of coughing upon lying down at night, and considerable sneezing on arising. He was very susceptible to every little change of the weather.

An examination of the nares made eighteen months previously, showed considerable swelling of the mucous membrane with a postnasal discharge. A roentgenogram at this time showed cloudiness over the ethmoids and a shadow over both antra. The transillumination was clear. Medical treatment, both local and general, was instituted for a period of a few months. The general symptoms were somewhat ameliorated although the child showed no great improvement. A roentgenogram six months later showed the shadow to be even more dense than in the previous picture. About this time the child began to have a low temperature, ranging from 99 to 100.5°, and also complained of frontal headache. The mother noticed also that he was beginning to sleep with his mouth open and constantly to clear his throat. From these signs she was sure that the tonsils and adenoids had returned.

The consulting rhinologist concurred in the diagnosis

of double empyema of the antra with ethmoiditis, and suggested immediate operation. As it was at the beginning of summer and the child was very much run down, we decided to wait until fall and in the meantime send the child to the sea coast and continue the medical treatment for the summer. As soon as he was taken to the Massachusetts coast his symptoms cleared up and he was apparently well until he returned late in September. Before he had been home a week he developed a severe attack of bronchitis of the asthmatic type, with temperature ranging from 99 to 102°. After the fever and acute symptoms had subsided an examination revealed that both antra showed more dense shadows than before. Transillumination was cloudy over both antra, but particularly over the right.

Antrumotomy with drainage was performed. Considerable pus was withdrawn from the antra, which gave a pure culture of Staphylococcus aureus. The temperature subsided one week following the operation. The child was well enough to be sent to school after two weeks. An autogenous vaccine from antra pus was made and five injections were given at four-day intervals. The only reaction followed the first injection. Both local and general treatment, with occasional washings, were used for a long period of time.

He has gained two pounds in weight, has had no subsequent attacks of bronchitis and attends school regularly. A roentgenogram taken in the latter part of October showed that the antrum shadow had cleared considerably. This case will be under continued observation for two years with a roentgenogram every six months. We expect a recurrence of symptoms in this case.

Case 4562.—Sidney S., 8 years old, was admitted to the hospital Aug. 23, 1923. His chief complaint was loss of appetite and loss of weight. He had formerly been a very active child but now tired easily. He gave a history of having had malaria six months previously although no blood examination was made at that time. The physical examination revealed a nervous, underweight child. Several lesions of impetigo were apparent. The tonsils were large and ragged in appearance with hypertrophied adenoids. He had six decayed teeth. He had marked phimosis. The heart and lungs were negative. Urinalysis showed two to three pus cells to the high power field, otherwise it was normal.

The child was circumcised, the tonsils and adenoids were removed and improvement was manifested by a gain in weight, strength and also in improved disposition. He attended school regularly.

A few months later he developed an acute illness resembling influenza, with fever, nausea, and vomiting. After the acute symptoms subsided a physical examination and the roentgenogram showed double empyema of the antra with ethmoiditis. Drainage was instituted and the tube was left in place. The antra were washed frequently. An autogenous vaccine was made. Comparison of the three sinus plates, made at intervals of several months, along with physical changes, show at the present time that the boy is practically well.

Case 4302.—Frances P., 11 years old, was admitted to the hospital Oct. 22, 1923. Her complaint on admission was of fever, marked general edema of the face and extremities, vomiting, and increased loss of vision.

She was first seen by me when a few months old, suffering from colitis. At that time she had been quite sick for about four weeks. After recovering from this illness she was normal until the third year of age.

She began at that time to suffer with recurrent tonsillitis. Urinalysis showed considerable pus which did not clear up until the tonsils and large, hypertrophied adenoids were removed at the age of five years. She remained well until the age of ten, except for an occasional cold which was accompanied by the return of pus in the urine, and followed by a severe frontal headache of three days' duration.

Her present trouble began Oct. 23. She began vomiting one day before admission and was unable to retain anything. Physical examination revealed swelling of the feet and legs, and puffiness under the eyes. The area of heart dullness was much increased, particularly to the left and downward. The heart action was rapid and irregular. There was no murmur. The tongue was coated and the nasopharynx was red and swollen with a purulent discharge from the post-nares. Urinalysis showed albumin 3+, many red blood cells, 300-500 pus cells to the high power field, hyalin and granular casts, and a diminished quantity of urine.

A blood chemical analysis showed urea nitrogen 31.5 milligrams per 100 c.c. of blood and creatinin 1.2 milligrams.

A roentgenogram showed a heavy shadow over both antra with all the landmarks obliterated. The ethmoids were very cloudy. The teeth were negative. The heart was enlarged for all measurements, but more to the left. There was no shadow.

The diagnosis was acute parenchymatous nephritis following empyema of both antra.

Twenty-four hours after admission the edema of all parts was much worse. The patient was unable to retain anything except a small amount of water. The urine became very scanty. Examination of the eyegrounds was negative. The ophthalmologist reported that the impaired vision was temporary and due to either bulbar neuritis or uremia.

Because the patient was so rapidly losing ground on the second day, antrumotomy was performed with the usual drainage. A pure culture of Staphylococcus aureus was isolated. The patient was quite slow in recovering though there was never any local tenderness manifest. Headache ceased in twenty-four hours after the operation, Oct. 22, 1923. The albumin persisted until Nov. 21, 1923, when only a faint trace remained. Subsequent analyses have shown a faint trace of albumin at times with varying amounts of pus. At one time following an acute coryza, a heavy trace of albumin was shown, with increased pus, though with no return of other symptoms. The sinuses were again washed out and the albumin disappeared.

A roentgenogram made Nov. 9, 1924, showed a considerable clearing of the antrum shadow. Our last report was that the child was attending school, and feeling perfectly well. Since the operation, the medical treatment has consisted in alkalin treatment for the kidneys followed by urotropin, and combined calcium during the cold weather particularly. Locally, suction and oil spray have been used for the nose. This child should be brought back for further observation frequently as there is a strong chance that any acute infection may cause a relapse.

Case 4563.—Charles C., age 10 years, was a fairly normal infant. He had diphtheria at four years of age, although the attack was not severe. During the following year he had frequent colds and attacks of ton-

sillitis. The tonsils were removed at the age of five During the next few years he had measles and influenza. He was a strong, healthy boy. At the age of nine years he began to have frontal headaches, particularly at night after returning from school. These headaches radiated downward toward the eyes. The boy claimed that they were worse during the school session than during the vacation period. He showed no evidence of cold, so the trouble was thought to be from the eyes. He was referred to an ophthalmologist, and the vision was pronounced perfect.

The headaches persisted. Physical examination was negative. Laboratory examination was negative. The rhinologist's examination was negative, except for some thick discharge from the posterior nares. A roentgenogram showed all the sinuses to be well developed. If anything, the frontal sinuses were overdeveloped. There was some cloudiness over the ethmoids. The maxillary sinuses showed no shadow. The rhinologist advised suction and occasional washings with an alkalin solution. Local treatment was instituted and calcium and cod liver oil were given, though the child's general condition was good. Considerable mucopurulent material was obtained by suction at each treatment. Two weeks after treatment was instituted the headaches became less frequent and less severe, and in one month they had entirely disappeared. An occasional return was cleared up by the use of local treatment.

Case 4309.—Nell W., age 8 years, had frequent attacks of tonsillitis and pus was found in the urine. A very large amount was found at the age of three years. The tonsils were removed at the age of three and one-half years and the urine cleared up, with alkalin and urotropin treatment. The child was well for two years. Following an attack of influenza, pus again appeared in the urine. There were several febrile attacks accompanied by symptoms of bronchitis lasting two weeks. Following this there was loss of weight and the child became very irritable. There was loss of appetite and the pus appeared and disappeared in the urine at intervals. A chest picture showed considerable bronchial thickening, though no other lesion. A head picture showed a shadow over both the maxillary sinuses particularly dense on the right. The ethmoids were clear. All the sinuses were poorly developed. Transillumination showed enlarged turbinates and posterior nasal discharge. The case was diagnosed double empyema of the maxillary sinuses. Drainage was instituted but the tubes were not left in place. The antra were washed at intervals over a short period of time. Calcium and cod liver oil were given for general treatment and the case improved and was lost sight of.

She returned six months later with a return of the symptoms. The second picture showed little change from the first. The mother refused to have the antra again punctured. Local treatment was instituted. The child has shown some improvement though a picture taken some months later still showed marked involvement. Failure in this case was probably due to the fact that proper drainage was not instituted at first and the case was not kept under observation. Our experience has been that drainage alone is worthless unless it is repeated and continued.

Credit should be given to my collaborators, Dr. J. J. Shea and Walker L. Rucks, for their assistance in this work.

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DISCUSSION (Abstract)

Dr. L. R. DeBuys, New Orleans, La.—Dr. Mitchell has added to our knowledge in regard to growth and development, and also has called our attention to another possible source of elevation of temperature of unknown origin. He has gone about his work in the proper way, by studying the normal first. He has shown the presence of the sinuses early in life. Our impressions a few years back were that the sinuses were rudimentary and could not be the source of any trouble.

Several years ago, after I first saw Dr. Mitchell's work in Memphis, I wanted x-ray examinations made in some obscure cases of temperature, and was unable to obtain them here because the technic had not been sufficiently developed. It is possible, as Dr. Mitchell has reminded us, that in the past, infection has prevented the development of these sinuses, and their importance therefore has been unrecognized.

One can appreciate the difficulty in collecting a series of cases in infants and small children if one has ever had occasion to try to keep these individuals still. The number of cases he presents here shows only a part of a large amount of investigation, because many cases undoubtedly have had to be discarded because of improper plates for reading. We hope that Dr. Mitchell will continue his work to establish normal standards, and that he may interest the radiologists in developing a uniform technic for radiogaphing these sinuses. We hope also that the rhinologists will become interested in determining some of the causes of obscure fever, and in investigating the prevention of normal development of these sinuses. This work should also stimulate the development of more thorough examinations of children.

Dr. McKim Marriott, St. Louis, Mo.—The importance of the sinuses in diseases of children has been recognized only in the last few years, and their importance, I think, cannot be overestimated. Many of the failures to get results from the removal of tonsils and adenoids are due to the fact that the sinuses are involved. An important side of the question, and one that was very well brought out by Dr. Mitchell, is that the children coming in with sinus infection present symptoms which we do not ordinarily associate with conditions in the nose and throat. For example, nephritis. Dr. Mitchell mentioned having some 15 of these cases. Nephritis of the type usually known as parenchymatous or tubular is so frequently associated with infections of the sinuses, especially staphylococcus infections, that it has become our custom now to have every patient presenting these symptoms examined to see if there is infection of the sinuses. Usually we have been rewarded by finding an infection which is staphylococcic. When that infec-

tion is cleared up the evidence of nephritis disappears and has not returned in most instances unless reinfection occurred. When such a disease as nephritis can be cured by treatment of the nose and throat, certainly a great advance has been made.

Dr. T. C. Hempelmann, St. Louis, Mo.—The following points should be emphasized as indicating a possible sinus infection: malnutrition, asthenia, headache, tenderness on pressure, dizziness, pain in the teeth, sudden visual disturbances amounting at times to complete blindness, dilatation of one pupil, persistent coughs and colds, asthma with or without protein sensitization. In certain instances chronic infectious arthritis and chronic parenchymatous nephritis can be greatly improved by proper drainage of infected paranasal sinuses.

Dr. J. J. Shea, Memphis, Tenn.—Continuous drainage, I think, is the cause of our success. It is sometimes necessary to insert a tube or catheter into the sinus and let it stay there for as long as necessary, some times for two or three days or a week. It is not the production of the discharge but its reabsorption that causes the trouble. Therefore, thorough drainage is very important.

Dr. M. F. Arbuckle, St. Louis, Mo.—I have opened the sphenoid sinus and found it filled with pus at post mortem early in the first year of life. Schafer, I think, makes the statement that the sphenoid is of sufficient size in the first year of life to be of clinical importance. The x-ray is not very reliable in diagnosis of disease in the paranasal sinuses. I have learned to depend upon the findings from physical examination, with the proper light, more than upon all other things put together. The macroscopic signs of inflammation are the most important findings in the presence of inflammatory diseases of the sinuses.

It is not essential to demonstrate pus in the nose. General symptoms are practically never absent, such things, for example, as loss of appetite, being underweight or undernourished, enlargement of the glands of the neck, and of the epitrochlear and axillary glands and even the inguinal glands.

LARYNGEAL DIPHTHERIA: REPORT OF THREE CASES

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These few cases are briefly reviewed primarily for two reasons. In the first place, the first case presented is unusual in that the patient survived after repeated intubation and a tracheotomy with neither stenosis of the larynx nor trachea. Secondly, the successful handling of such cases does not depend solely upon the administration of antitoxin and intubation, or tracheotomy, as the case may require. There is a distinct medical aspect, and one which the writer believes the head specialist is prone to neglect. Indulgence is asked if this phase seems over emphasized. At any rate, just because one is doing surgical work, one should not forget one's general medical training.

The first case is cited in full because it is by far the most instructive. The other two are only briefly mentioned inasmuch as they happened to be in the hospital during the same period of time as the first case. By way of interest, it should be mentioned that they were all from the same locality where the disease prevailed in mild epidemic form.

Certain general principles were carried out in all the cases. After intubation, the thread was not severed from the tube but pasted by a pieece of adhesive to the cheek. This is contrary to the usual custom but allows for quick withdrawal in case of an obstructed tube. This seems to be important particularly in the case of infants where the diet is wholly liquid and, therefore, more prone to enter the tube. Feedings were well taken despite this arrangement. Fluids were at all times forced, particular stress being laid upon sufficient nourishment, and enough water to prevent dehydration. Feedings were all given in the Casselberry position. No pillow was allowed. The infants were fed with a medicine dropper at frequent intervals, as they were disinclined to take full feedings at one time. All drugs were given hypodermically. The dosage was reduced to comply with the age of patient, Young's rule being followed.

Case I.—A male, age 6 years, was admitted Sept. 25, 1924.

P. I.—A diagnosis of diphtheria had been made 24 hours previously by an outside physician and 10,000 units of antitoxin had been administered intramuscularly. Early on the morning of admission the child developed marked stridor and cyanosis. An intubation was done but the tube was coughed up before the patient's arrival at the hospital.

P. H.—He had had most of the diseases of childhood, the most serious of which was scarlet fever.

F. H.—Five children lost at birth or immediately thereafter. Inquiry of family doctor revealed cause not specific but due to contracted pelvis.

P. E.—Head: Eyes react to light and accommodation. Rotations and excursions are good. Media clear and eye grounds negative. No discharge from the nose, either serous or bloody, and no membrane is visible. There is distention of alae with respiration due to respiratory dyspnea. Throat is poorly seen but there is apparently no membrane on the tonsils, fauces or pharynx. There is painful deglutition. The infratonsillar glands are palpable but not markedly enlarged. There is marked stridor both on expiration and inspiration, more marked on the latter. The child coughed up grayish, purulent material from lower respiratory tract.

Chest: There was slight play of the accessory muscles of respiration. Percussion was negative. Auscultation was negative except for coarse rales, probably orig-

inating in upper respiratory passages. Heart was normal on ausculation and percussion.

Abdomen: Negative.

Genitals: Negative.

Extremities: Negative.

General: Color was good. Nutrition was good. The temperature was 102° (m) and the pulse was 130.

Tentative Diagnosis: Primary laryngeal diphtheria.

Therapeutics and Course. Twenty thousand additional units of antitoxin were given at once intramuscularly. Dyspnea became progressively worse and the respiration so embarrassed that an intubation was done twelve hours after admission. A No. 6 O'Dwyer tube was used. (It is well to interpolate here that a tracheotomy set was always at hand when an intubation was done, and was kept constantly in the room. The wisdom of this is evidenced by the suddenness with which it was necessary to use it later. A small portable operating table was also kept in the room for such an emergency.) It is interesting to note that during the next twenty-four hours, the tube was coughed up and replaced five times. This is an argument against intubation in the home, because asphyxiation was narrowly averted once, the tube having been replaced just before the child went into collapse.

Atropin sulphate was then given every four hours. That was done largely because of excessive secretion of saliva with some accumulation in the tube. The rationale of this drug extends further. Excessive bronchial secretion, itself at times a cough excitant and sometimes a source of obstruction to breathing, was checked. The drug is to a certain extent also an antispasmodic, tending to relieve bronchial spasm which might possibly be reflex from the intubation tube. The latter is, of course, purely theoretical. Atropin is also an excellent respiratory stimulant. Occasionally, small doses of codein were added if coughing was excessive. At evidence of a slight rash, the atropin was reduced to one dose every twenty-four hours. No other narcotic other than codein was used to control the cough, and this very carefully because firm faith is placed in that little expression, "The cough is the watch dog of the lungs." Under such therapy, the tube was comfortably and well retained for forty-eight hours.

Digitalis was given every four hours the first forty-eight hours, and after that, just enough was given once every twenty-four hours to maintain digitalization. This was done merely as a prophylaxis against acute cardiac dilatation. It would seem that this forethought stood this patient in very good stead as was evidenced by the later clinical course.

On the third night after admission, he suddenly became cyanotic, developed a marked stridor, and without any warning respiration ceased with the tube *in situ*. The writer was out of town at the time and his associate, Dr. D., did an emergency tacheotomy, although the tube was taken out first and another introduced. The child started to breathe only after the trachea was opened and artificial respiration instituted. The obstruction was probably caused by the lodgment in the trachea of a large piece of membrane; for after tracheotomy, he expelled through the wound a quantity of membranous material.

The author held no hope for his patient when he saw him again. There was profound collapse and coma. Active stimulation was at once instituted, strychnin and atropin sulphate being used every six hours alternately. The foot of the bed was elevated and no pillow used. It is believed these measures lessened drainage into the bronchi. A Yanhauer suction machine was placed in the room and a small catheter attached. This was kept clean in a piece of sterile gauze and the nurse instructed to cleanse the tube at once when the tracheotomy tube became filled with mucus. (Method used by L. W. Dean.) A No. 3 Jackson tracheotomy tube was used. Between the times at which the tube was cleansed, a piece of sterile gauze moistened in normal salt solution was kept over the tube's opening.[1] No codein was used after tracheotomy, for the cough is one of nature's best weapons against a bronchpneumonia. A little whiskey was added to the eggnogs given.

The patient responded remarkably well to treatment. The tube was removed and cleaned on the third postoperative day, and once a day thereafter. The suction above mentioned was used at all times, and was constantly at the bedside.

As early as the eighth day, the tube was removed for a few hours. The patient showed no signs of stenosis, and breathing was free and easy, even with the wound packed with gauze. Each day the time during which the patient was without the tube was increased and the wound was packed to keep down granulations. After the tenth day the patient did not wear the tube again. The wound was packed lightly with gauze and allowed to granulate from the bottom.

Something should be said as to this tracheotomy wound. It was a transverse incision, fully a finger's breadth below the cricoid cartilage, and about an inch and a half in length. As nearly as could be determined postoperatively, there must have been about three tracheal rings intervening between the opening and the cricoid.

The patient was gotten out of bed gradually, the semirecumbent position being given first, for increasing periods. He was discharged October 12th, 1924.

An examination of the larynx was made both with a Jackson spatula and by indirect laryngoscopy. The cords were a little thickened but approximated well. There was slight roughening of the false cords and the arytenoids. Otherwise, the findings were negative. He has continued to do well since discharge. Several subsequent examinations have been made, all with negative findings. He ran a slight afternoon temperature for a while following dismissal, but this was in all probability due to absorption at site of the tracheotomy wound. This has healed nicely with a slight scar. At time of writing, he is doing well and there is no obstruction to breathing.

During the same period, two other cases were admitted to the hospital, both requiring intubation. The last two cases, however, were much younger children.

Case II.—A male baby, age one year, was admitted to the hospital Oct. 8, 1924. Briefly reviewed, these facts stand out:

(1) The medical history was bad. Malnutrition had existed practically since birth, and for which condition he had been treated by several physicians. He was a full term, breast fed baby. The labor had been normal. Ten thousand units of antitoxin had been given prior to admission.

(2) Physical examination showed typical laryngeal stridor and more or less aphonia. Other gross physical

findings were negative. Temperature 104° (r); and the nurse could not count pulse.

Tentative Diagnosis: Primary laryngeal diphtheria.

Eight hours after admission the child became so dyspneic that he was intubated with a No. 1 O'Dwyer tube which was worn until death occurred. This took place three days later despite all life-saving efforts. Glucose and saline was given by rectum. The breasts of the mother were pumped and her milk fed to the baby. Twenty thousand units of additional antitoxin were given. Atropin was given when necessary to check excessive saliva and mucus. It was not given oftener than every twelfth hour. The baby's death was probably due to cardiac failure. It was not due to asphyxia, there being no struggling or cyanosis and the tube was patulous when removed. Breathing was free and easy until death.

Digitalis was not used in this case but this is not at all significant in so small a series of cases. It must be remembered, too, that malnutrition was a prominent factor in this case.

Case III.—A female baby, age eighteen months, was admitted to the hospital on Oct. 11, 1924. To conserve space and eliminate uninteresting data, this history is also briefly abstracted as follows:

(1) The history was negative throughout except for the present illness, the onset of which was sudden. As in the other two cases, the diagnosis was made by an outside physician and 10,000 units of antitoxin had been given prior to admission.

(2) A physical examination disclosed what was probably a membrane on the tonsils. There was no evidence of nasal diphtheria. There was marked dyspnea and some aphonia. All other findings were negative. Temperature was 100.4° (r) and the pulse was 130.

Tentative Diagnosis: Secondary laryngeal diphtheria.

Twenty thousand additional units antitoxin were given at once intramuscularly. Respiratory embarrassment steadily increased until it was felt that it was not safe to wait any longer and the child was intubated eight hours after admission. Respiration, as in the other cases, at once became unembarrassed. Atropin was used sparingly but as indicated. The patient was digitalized at once as in Case I.

At the end of the third day the tube was removed but a marked stridor returned and the child was again intubated. At the end of the fifth day the tube was removed and the child made an uneventful recovery. She was discharged Oct. 18, 1924, and has since continued to do well with no complications whatsoever.

It will be noted that no cultures have been reported. In all cases, the aphonia, the hoarse stridor and, above all, the progressive increase of dyspnea was so characteristic of laryngeal diphtheria that the diagnosis was made at once on clinical signs alone. Furthermore, it would not have been safe in any of these cases to put off intubation pending the report of cultures. However, feeling that he might be severely criticised for diagnoses made on clinical signs alone, the writer made a smear and a culture directly from the membrane on the intubation tube the first time Case 3 was extubated. In this case, the diagnosis could easily be made from the smear alone. All fields were filled with typical organisms. Bipolar and beaded bacilli abounded. Particularly significant was the frequent grouping in phalanx arrangement.

It might be added as a last thought that these cases were treated in an active surgical hospital. They were isolated, of course, with special nurses and every precaution was taken. Not one case of diphtheria was contracted during this time nor has one resulted since.

It would seem, in summing up, that these few cases illustrate the importance of the following:

(1) Early diagnosis and early administration of large doses of antitoxin.

(2) Early intubation if dypsnea is progressive. Certainly one should not wait for absolute collapse.

(3) Atropin is a valuable drug in such cases if judiciously used.

(4) No case should be considered hopeless as long as hospital facilities are available, and not until every therapeutic means has been exhausted.

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MEDICAL EDUCATION

A METHOD OF PROMOTING STUDENTS AND ITS EFFECT UPON THE STUDENT BODY*

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I take it that one of the greatest tasks of all school executives, which is also one of their greatest privileges, is the stimulation of high ideals among the students, particularly regarding their studies and examinations, although their general conduct and attitude toward patients in dispensary and wards and their purpose in their relation to public service, are important factors in the complex. A loyal faculty of the right type makes this task much easier, and, incidentally, these standards seem quite as desirable for measuring the faculty as their skill in diagnosis or treatment or their standing in the community.

Two fundamental methods are employed in striving to accomplish these ends. The first is the method of inspiration. The second involves rigid requirements and strict adherence thereto, with certain penalties for failure. Of the two I like the former better. It is pleasanter and it is more flexible; but, of greater importance, it is productive of surer and more permanent results because it puts the initiative where it belongs, inside, and not outside, the student. Moreover, it is safer. To borrow the darky's homely paraphrase, you can lead a mule to water, but it is dangerous to twist his tail to make him drink. Students and mules are pregnant with kicks.

Two years ago, on assuming administrative duties, I determined to try to apply to the whole school with some elaborations some ideas I had applied in a measure in my own department. I found in the office records fairly well kept of the usual term, semester and final examinations. For the upper classes particularly the system seemed obsolete. As a rule the clinical teacher was required to give a semester examination twice a year, of perhaps an hour. Such examinations usually consisted of five fairly comprehensive questions. Sometimes the questions were not so comprehensive. It depended upon the energy and conscience of the examiner. If a student made two grades of 90 he was considered a good student. If he made 73 and 75 he failed in the year's course. If he made 74 and 76, he passed. The grades were given out, and the office was almost mobbed for reports. The student with the first combination was gratified. The student with the second considered himself a martyr to somebody's prejudice. Too often the student with the last combination was satisfied. Between the second and the last there was little real difference in ability. The temptation to get a point or two on examination by hook or crook was great.

The whole system was discarded and the following rules adopted:

EXAMINATIONS, GRADES, PROMOTIONS

EXAMINATIONS. Regular semester examinations are given twice each year. Examinations for removal of conditions and for advanced standing are held during the week preceding the opening of the session. Final examinations in a minor course may be given during regular hours at the end of a course, in the discretion of the teacher in charge. A special final examination may be given for exceptional reasons only.

GRADES. Grades will be certified to the Dean on a percentage basis by the teachers in charge of examinations. A grade of 75 per cent or higher is passing. A grade of 60-74 per cent means a condition. A grade below 60 per cent means a failure.

PROMOTION. Promotions will be made by the Committee on Promotion and Advanced Standing, who will be governed, so far as scholastic grades are concerned, by the following rules:

1. Grades shall be submitted by the Dean as reported by the teachers in charge of examinations.

2. A student with a condition must take a supplementary rank examination for its removal during the fall week of rank examinations. If he fails to pass, the condition becomes a failure and he must repeat the course. A failure so incurred may be carried through the following school year, but must be removed during the following fall rank examinations after repetition of an equivalent course in a summer school approved by the committee. If a failure so incurred is not removed before the beginning of the next year's session, the student automatically bars himself from promotion with his class.

3. A student with a failure must repeat the course before he may take a rank or regular examination for its removal. Such repetition may be in an equivalent course in a summer school approved by the committee. A student who fails in a subsequent examination to remove a failure after repeating the course automatically bars himself from promotion with his class.

4. A student who automatically bars himself from promotion with his class may file with the Dean a written petition to the Committee on Promotion and Advanced Standing for permission to repeat all the work of the year in which his failure occurred. If a vacancy exists in that class, the Committee, for exceptional reasons, may grant the petition, but preference will be given to other students whom the Committee may consider more desirable.

5. No condition or failure may be carried into the Senior year.

Scholastic standing is not the only requirement for promotion. This School, through the action of its Committee on Promotion and Advanced Standing, reserves the right to refuse to promote any student who does not satisfy the Committee that his moral and physical fitness and his attitude and conduct in the School and Hospital warrant further investment by the School in his medical education. [Thus, he may have grades above 75 per cent, to a transcript of which he is entitled in terms of H (90-100 per cent), C (80-90 per cent), P (75-79 per cent), E (60-74 per cent), and F (less than 60 per cent); but he may fail of promotion in this School.]

6. For exceptional reasons, such as illness, absence from

*Read in Conference on Medical Education, Southern Medical Association, Eighteenth Annual Meeting, New Orleans, La., Nov. 24-27, 1924.

class or clinics may be excused. Attendance will be considered in determining promotion. At the most a student may not be absent more than 20 per cent of the hours required in any course, but anything like such absence will militate against promotion. After examinations, grades shall be submitted to the Committee on Promotion and Advanced Standing by the Dean, as certified to him by the teachers in charge of the examinations. Each student shall be considered on his merits as indicated in the previous paragraph, and shall be ranked by the Committee as follows:

P.H. (Promoted with honor. Scholastic grade 90 per cent or above required in all courses.)

P.C. (Promoted with credit. Scholastic grade 80 per cent or above required in all courses.)

P. (Promoted. Scholastic grade above 75 per cent required in all courses.)

E. (Conditioned;, in what courses to be stated.)

F. (Failed; in what courses to be stated.)

The marks thus fixed by the Committee shall be recorded in the Dean's office and reported to the students on form cards as soon as possible. No other information concerning final grades may be given out by any one.

The Committee on Promotion and Advanced Standing is charged with responsibility for final ranks and its actions are not subject to revision.

The School reserves the right to terminate the attendance of any student at any time, if, in the opinion of the Committee on Promotion, that student's ethical standards or fitness for the study and practice of medicine are not in keeping with the standards of the University of Louisville and the medical profession at large; and each matriculant agrees to this reserved right.

After one year out of school a student forfeits his enrollment and thereafter must re-matriculate and satisfy the prevailing requirements for entrance and advanced standing if he desires to reinstate himself in this School.*

In applying these rules the Committee on Promotions expects sessions of two to three hours, and the members sit in gladly. The Committee is confined to the salaried teachers because we have a right to demand their time for such work. The paid teachers in medicine and surgery and obstetrics, who spend much of their time in the dispensary and wards of our hospital, at present cover the important subdivisions of those departments. Next year we expect to add at least two paid teachers in pediatrics. With our increased organization of academic teachers we plan to make one important improvement in this system.

I believe that final grades fixed by the committee, and not the percentage examination marks, are the ones which should be recorded permanently on each student's record by the registrar. A teacher of anatomy recently argued that the office should keep separate grades for standings of a freshman's work in head, thorax, abdomen, extremities and nervous system. I maintain that the office is not interested in those grades, but only in the final decision as to whether that freshman is sufficiently trained in the fundamentals of gross and microscopic anatomy to enable him to use his anatomy in the study of subsequent subjects. He must be so taught that he will take joy in applying his knowledge of anatomy to the study of clinical medicine and not try to forget a nightmare of half comprehended facts. The course grades should be kept in the department and the department's final estimate of a student in the office. Incidentally, that student's future work is the best evidence of good teaching in anatomy. We are primarily training physicians and not anatomists, although, of course, a side activity of the right kind of a department of anatomy is to train some anatomists.

Another point about this improved system is that no one teacher can "fail" a student. For some reason, for example, the student may not have become sufficiently interested in neurology, but he may be a whirlwind in chemistry. If he is, he has brains, and the problem is, not how to "fail" him in anatomy, but how to have him learn enough anatomy to acquire a creditable final grade. The basis for working out that problem is obvious.

In most schools these problems are safer among the teachers of the fundamental sciences. The majority of clinical teachers are busy men. The better teachers they are, as a rule, the busier they are. They like to teach. It is a pleasurable stimulation to sow the seeds, but an unpleasant duty to reap the harvest and separate the wheat from the chaff. To begin with, these clinical teachers are entitled to good ground for their sowing. In the second place, it becomes necessary to have sufficient professional teachers rather than a superabundance of teaching professors. The progressive medical school which fulfills its mission must have at least a well developed skeleton of essentially full time men to carry the load and on which may be draped the adornments of medical education. The school which can provide expensive adornments is fortunate, but most of us need all the money we have for bone and muscle. These professional clinical teachers must not only know the fundamental sciences, but must be able to apply them and to teach the budding physician how to apply them. Even more important, these teachers must be of such character and vision and energy that they will imbue the students with the ideal that careful, conscientious and intelligent application of their preliminary sciences in the dispensary and wards—better, perhaps, in reverse order—is absolutely essential, not to pass examinations, but to practice medicine with honor and profit.

Here is where our system of inspiration and penalty, with the accent on the former, is bearing most gratifying fruit. Attendance at clinics has improved greatly. In time we shall forget

*After two years trial this method has been modified to the extent that grades for each course are issued to the students in terms of P.H., P.C., P.E., and F.

the bugbear of roll call. The grade of work has improved even more. Histories are being written for a purpose and not to fill paper. Laboratory work is being done conscientiously because the student wants to *know*. Physical examinations are being made in an hour instead of fifteen minutes for the same reason—and incidentally because the weekly clinical pathological conference is comparatively grading teachers and students alike in the minds of every upper classman. The whole work of the last two years has been improved tremendously because the students have come to like the work and because they have come to realize that honest, efficient, daily work in the dispensary, the laboratories and the wards, and not semi-annual percentage grades from crammed-for, written quizzes, will be the basis upon which they will be promoted. As this conviction permeates to the lower classes the latter think how and what they should remember for future use. Anatomy, chemistry, physiology, pharmacology, bacteriology and pathology acquire a new meaning. No one cares a hang about the "thirteen points of interest"—God save the mark—on the petrous portion of the temporal bone, but every one is eager to learn the structure and circulation of the heart or the chemistry of air in the lungs or the difference between the toxins of staphylococcus and streptococcus; and, incidentally, this impression is strengthened by the knowledge that the internes will be picked from the upper half of the senior class on the purpose, personality, character, conduct and disposition demonstrated in the hospital the last two years, more than on any paper grades. If the Committee on Promotions as a whole does not think any student is going to make the right kind of upper classman the Committee decides not to give him a chance. There is no room for any argument with the Dean or any teacher. The composite opinion of a group of teachers is that the student not promoted is not fitted for some reason to prepare himself for the right kind of public service and is not worth the investment of hundreds of dollars more than he pays to the University. That reason is usually sufficient for the student, his friends and the public—and I have found this to be solid ground in some situations which might otherwise have proved very embarrassing.

Just one word more. To carry out these plans it is necessary to select the right kind of students at the beginning. For this allied topic there is not time for discussion. How we acquire this information is shown in part in the appended forms.[1] A photograph or personal conference is required from every prospective new student. This work cannot be left safely to a clerk. This is the fundamental duty of the Dean and a conscientious entrance committee.

There is so much to be said on this vitally interesting subject and I have become so much interested in it that I am afraid I have taxed the patience of those longer in this work. However, I do want to tell you that our experience has been most encouraging. It is rapidly transforming the whole student body and is markedly affecting the faculty. Why, even the sophomore class voted not to cut classes on last election day. Stimulating inspiration to make good for devoted public service in the greatest profession in man's history—not fear of marks—is the secret.

DISCUSSION (Abstract)

Dr. C. R. Hannah, Dallas, Tex.—There are some things that have been coming to me for a long time relative to grading a man. Dr. Graves spoke of the lettering, A, B, C, etc., which is very good. When you come down to 75, if the fellow makes 74 he has failed; and he is conditioned. When a man makes 75, and some one else makes 74, I do not know that the man who makes 74 or 73 is not just as good. I do not see why we could not go down to 70 before we conditioned him. In the same way, we "fail" him when he goes under 60. Another problem is when to condition him, to do it in a week or do it the next fall. It may be that he is cut out of a year's work if it is allowed to go over.

Dr. Joseph Cohen, New Orleans, La.—I was glad to hear Dr. Graves lay stress upon inspiration rather than upon punishment methods. We are trying to produce physicians, not trying to make a medical school an arbitrary place where they produce automatons. I am not so far from my student days as not to feel keenly what Dr. Graves says. You will get much better work than if you prescribe arbitrary standards and try to fit the student to those standards. I am also glad to see that the men on that committee are in actual everyday practice. They have not been narrowed by the laboratory methods which the salaried man, who stays there day in and day out, falls into. They know what a man has to contend with when he gets out, what pitfalls he has to meet; and if they are on the committee they know whether that student is likely to fall into those pitfalls or whether he is likely to be a good physician.

I have never seen or read an outline such as presented by Dr. Graves, and I hope more of us can put it into practice in the other schools.

Dr. Graves (closing).—Rank examinations are given only in the week preceding the opening of school. We are trying to get away from the repeated rank examinations. Another thing is that we do not lay stress upon 75 as the passing mark, nor 60 as failing, but try to get away from the old idea that if a man gets 76 he passes; and if he gets 74 he fails. The later idea is to determine whether or not a man is fit to study medicine. If the man obtains a doubtful rating the idea is that the University should give him a further opportunity to demonstrate his fitness.

1. Copies of these forms will be furnished on request.

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PATHOLOGY OF THE PANCREAS IN DIABETES

It is still extremely difficult to show histological changes in the pancreas in mild and often even in severe diabetes. The discovery, in 1890, by von Mehring and Mikowski that fatal diabetes followed pancreatectomy in dogs first definitely related diabetes with this organ. Other workers narrowed the relation to the islet tissue only. Lane, and also Bensley,[1] in 1911, evolved methods of staining which showed essential differences in types of islet cells.

In a period after the removal of a large part of the pancreas of animals, swollen, degenerate cells, which apparently have been overstimulated and have absorbed excess fluids, appear in the islets.[2] The secretory granules of the *B* cells, the antidiabetogenic cells, disappear. The cells undergo hydropic degeneration, and fatal diabetes may follow without disturbance of the remaining acinous tissue.

Allen,[3] in 1922, studied the microscopical changes in diabetes extensively. He showed that in animals development of vacuolation, or hydropic degeneration of the *B* cells, began in from four to seven days after severe experimental diabetes. The *A* cells retained their granules in so-called total diabetes when no *B* cells were present. In cases of human diabetics who came to autopsy, hydropic degeneration could sometimes but not regularly be observed.

The actual condition of the pancreas is of interest clinically in connection with prolonged administration of insulin. Whether the insulin must be used throughout life, whether the diabetic may become increasingly dependent upon it, as is the case in the use of most drugs, or whether it actually allows some recovery of the normal secreting power of the islands, are open questions.

Boyd and Robinson[4] have reported a case of a diabetic child, seen at nine years of age, an emaciated dwarf, who had a diabetes of long standing and a family history of diabetes. Under insulin treatment for a year he showed remarkable improvement in weight and appearance, and became "the leader of the gang." His carbohydrate tolerance increased and insulin requirement notably diminished. He sustained a fractured skull while sleigh riding, died three hours later, and was immediately autopsied. Careful examination of the pancreas, according to these authors, showed evidence of regenerative processes. Drs. Allen, Opie, and Bensley, agreed, though with different pathological interpretations, that there was microscopic evidence of regeneration.

In peripheral areas of the stained sections of the pancreas, the islands were much more numerous, and seemed to be of a different type from the central islands. They were smaller, the cells were larger, and there were few or no *A* cells. They were composed almost entirely of the *B*, or antidiabetogenic, cells. These Boyd and Robinson considered to represent younger islands, which had appeared since the beginning of insulin treatment and were responsible for the increased carbohydrate tolerance.

1. Bensley, R. R.: Studies on the Pancreas of the Guinea Pig. Am. Jour. Anatomy, 12, 3, 297, 1911.
2. Homans, John: J. Med. Research, 30, 49, 1914.
3. Allen, F. M.: J. Metab. Research, vol. 1, 1922.
4. Boyd, G. L., and Robinson, W. L.: Evidence of Regeneration of the Pancreas in an Insulin Treated Case of Diabetes. Am. J. Path., 1, 2, Mar. 1925.

The power of forming new island tissue has been deficient in children under dietetic treatment, according to Allen, and little opportunity has been offered for pathological study of cases of diabetes treated with insulin. It has been suggested[1] that the pathological changes in the pancreas in severe diabetes may be due not to failure of the pancreas to regenerate, since the pancreas seems to be able to regenerate, but to continued injurious action of the causal agent, overcoming the regenerative efforts. The possibility of a rare permanent cure of a diabetic child after a period of insulin therapy is thus held out.

AN ENGLISH SERO-DIAGNOSTIC TEST FOR CANCER

The popular press has found so many cures for cancer that the sane physician can hardly turn his head today before a new organism or method of treatment is announced. Nevertheless, the fact remains that the cause of cancer is yet unknown, that many able men are devoting their lives to its study, and that in the future the facts will be elicited. Investigations published in the *British Medical Journal* recently have aroused comment, and have given further information regarding malignant growths.

Kennaway[2] has experimented on cancer-producing tars, obtained from acetylen, isopren, coal tars, from yeast and from human skin, by raising these to very high temperatures. He has observed that the temperature at which the tar is produced affects its property of giving rise to cancer in animals. Apparently unknown specific compounds are formed in coal tar at temperatures between 560 and 1250 degrees more readily than at lower temperatures. The tar from human skin was formed by heating to 920 degrees, and when painted on animals produced tumors in 198 days in 13 out of 16 mice. The author suggests that some such compound may be formed in animal skin at body temperature in small quantities and thus cause cancer.

In the same number of the *British Medical Journal*, Fry[3] describes a serum reaction for the diagnosis of malignant disease, in which he claims 75 per cent correct results.

A specific antigen, which was extracted from rapidly growing human breast carcinomata, was used. The patient's heated serum was used undiluted and in dilutions up to 1-10. On addition of his cholesterinized antigen and saline to the serum, according to a described technic, coarse flocculation was apparent in positive sera.

If verified by further workers and technically further improved, this test may become clinically useful. The complement-fixation test, as Fry says, has been widely employed in the attempt to discover cancer antibodies in the blood serum. In 1912, von Dungern,[4] for instance, published a method for which he claimed 100 per cent success. His claims have failed of substantiation by other observers.

Fry's report is taken by some, apparently, as specific evidence of the microbic causation of cancer. This would not necessarily follow the demonstration of a precipitation reaction in the blood serum of cancer patients. Blood serum tests are used commonly to show that bacteria have invaded the system and the serum has reacted. But similarly any foreign protein which is injected into the circulation will give rise to antibodies of reacting substances. The epithelial cell, abnormally stimulated and growing as in carcinoma, could logically give off toxic substances to the blood, with which the blood would react.

Fry's work throws further light upon the cancer problem, and may point the way toward an earlier diagnosis.

1. Warren, Shields, and Root, H. F.: Am. J. Path. 1, 4, 415, July, 1925.
2. Kennaway, E. L.: Experiments on Cancer Producing Substances, Brit. Med. Jour., 3366, July 4, 1925.
3. Fry, H. J. B.: A New Flocculation Reaction for the Sero-Diagnosis of Malignant Disease. Brit. Med. Jour. 3366, July 4, 1925.
4. von Dungern: Muensch. Med. Woch., 11, 65, 1912. Quoted above by Fry.

THE LONE STAR STATE

Texas is known in history as the state over which six flags have flown. In 1682, La Salle, sailing down the Mississippi from Canada, claimed all the Mississippi valley for France. A hundred years later all the region west of the Mississippi was ceded by France to Spain. Texas was later for a while under Mexican dominion but revolted and existed as an independent republic for ten years, until the Congress of the United States was willing to annex it about fifteen years before the Civil War. It seceded with the Southern States of America in 1860, and suffered from the period of reconstruction as severely as did the other Confederate States.

The large and hustling Texas city in which the Southern Medical Association will convene this fall was non-existent a hundred years ago. Indeed, in the whole state there was scarcely a handful of white men, and only three permanent settlements.[1] Texas has grown with the growth of the United States, and from a population of 210,000 in 1850, it has increased to nearly five million in 1920, with a correspondingly great increase in wealth. It has been famous in story for its rangers, who guarded the frontier and for its cowboys. During the Civil War, one of its soldiers is said on a bet to have captured from the enemy's camp with only a lasso, a Federal officer, who was trying to shoot him. He dragged the officer into camp and later apologized profusely for having accidentally broken his arm.

Roosevelt went to Texas to organize his famous "Rough Riders" during the Spanish-American War. Roosevelt said of one of them, Bill McDonald, that he "would charge Hell gladly, armed only with a bucket of water." These men have made Texas known over the country and often their type has been described.

In the last quarter of a century or more, the great agricultural advantages, pasture lands and rich soil, irrigation, seaports, and the discovery of oil fields, have caused rapid immigration to Texas.

Texas was the first state in the Union to elect a woman governor, and "Ma" Ferguson's rule over Texas is being watched with interest in all parts of the United States.

Dallas, the Convention City for 1925, is like many other rapidly growing cities of the South, but with an individuality peculiarly that of Texas. Southern physicians and their families who understand the value of "seeing America first" will not miss the opportunity in November of traveling into that great Southwestern state, and becoming better acquainted with its people and its institutions.

1. Benedict, H. Y., and Lomax, W. A.: Texas, Garden City: Doubleday Page & Co., 1916.

Dallas—Where We Meet

THE DALLAS HOTEL ACCOMMODATIONS

Dallas is delighted to be able to offer the assurance to delegates and visitors at the convention of the Southern Medical Association November 9-12 that there will be ample and excellent hotel facilities. There is perhaps no city of America the size of Dallas, save resort cities, that will be able to supply this fall so many guest rooms for visitors as will Dallas. The total hotel valuation of Dallas this fall will exceed $25,000,000, with total accommodations for 17,500 guests.

Around 3,000 rooms have been set aside by the Dallas hotels for the Southern Medical Association, and if necessary, this number easily can be augmented. The Convention Department of the Dallas Chamber of Commerce is taking pains to see that no other convention comes on the dates named.

The Hotel Committee of the Dallas County Medical Society, entrusted with seeing that all delegates to the Southern Medical Association are comfortably housed, is able to offer such ample accommodations due to the enormous hotel building program nearing completion. This program has called for an expenditure of more than $12,000,000 on Dallas hostelries during the past two or three years.

A word as to some of this hotel construction. The Adolphus, convention headquarters for the Association, is adding a 300-room, 22-story an-

ADOLPHUS HOTEL, GENERAL HOTEL HEADQUARTERS

nex at a cost of $750,000, which will bring its total guest rooms to 825, ranking it among the largest hotels of the Nation. From the outset the Adolphus has been characterized by features found in the most elaborate hostelries in the United States and with the addition still other features will be added, notably an enlargement of the lobby.

The Baker, just across the street from the Adolphus, supplants the old Oriental, which will be remembered, perhaps, by some of the visitors to the Southern Medical Association the last time it met in Dallas. The Baker is an 18-story building with 700 rooms, practically all of which will be ready for occupancy by the convention dates.

Another new hotel, formally opened in August, is the Hilton, just across the street from the City Hall. It has 14 stories, with 320 rooms, and cost $1,000,000.

The Scott Hotel, 10 stories, with 153 rooms, is another new building, its formal opening to be held in September. It is just a block from the Union Terminal Station.

Other notable additions to Dallas hotel facilities are Stoneleigh Court, Melrose Court and Maple Terrace, three modern apartment hotels recently completed at a combined cost of more than $4,000,000. These 8-story hotels, each covering a wide area, have from 125 to 150 apartments each, and will have available a number of rooms for visitors.

Since the Southern Medical Association last met in Dallas, the Jefferson Hotel has been completed as a 12-story, 450 room structure. It is just across the street from the Union Station. Then there are such well-known and popular hotels as the Southland, 8 stories, 204 rooms; the Waldorf, 150 rooms; St. George, 150 rooms; Campbell House, 108 rooms; Milam, 60 rooms; Park Hotel, 175 rooms; Oak Lawn Inn, 60 rooms; Cliff Hotel, 147 rooms, together with something like 100 smaller hotels.

Dallas has just cause to be proud of its hotels. They make many friends for the city. When Rex Beach was completing the material for his famous Texas oil field story, "Flowing Gold," he stopped at a Dallas hotel for a few days and was so impressed by it and other metropolitan features there that he commented: "One has to rub his eyes upon awakening the first morning to make sure he is not in New York."

The word "Texas" is of Indian origin and means "friendly." The Texas spirit of friendly hospitality bears out this name and it is well exemplified in Dallas hostelries. It is safe to say that visitors at the Southern Medical Association meeting will find reflected in the "city's guest rooms" the same genial spirit of individual welcome and service that characterizes the private homes of hospitable Dallas and Texas.

There is a wide range of prices at Dallas hotels, varying with accommodations offered. These prices are not advanced during conventions. In Dallas hotels one may be served as simply as in a private home or dine as sumptuously as at a Roman banquet. In hotel rooms or suites comfort is offered at little cost and luxury at reasonable prices. All modern conveniences are found in Dallas hotels. There are luxurious ballrooms with beautiful music, attractive roof gardens, and high class restaurants. Restaurants in Dallas, either connected with hotels or independent, are of a generally high standard. Some of the highest-priced chefs of the Nation are employed. One can get meals with a Western flavor, Mexican dishes, Chinese dishes, old-fashioned Southern cooking or other distinctive dishes. All the year truck gardens and farms are producing products in some part of vast and diversified Texas and this, coupled with the proximity to packing houses, poultry farms and orchards, tends to make for reasonable food prices, as well as freshness and a variety of food.

Frequently in the case of a large convention, visitors find it difficult to secure rooms with bath, but such will not be the case at Dallas. All of the rooms of the Baker, Hilton and Scott hotels, or a total of 1173 rooms, will have private baths. Most of the rooms of the Adolphus now have private baths and all of the addition are to be of that character. Of the Jefferson's 450 rooms, 300 have private baths and other large hotels have a goodly proportion of private baths; and those rooms where there are community bathrooms to the floor usually have running water in the rooms.

The Southern Medical Association will be the first large convention to take advantage of Dallas' vastly increased "hotel plant." In effect it will be a "house warmer." It is the confident belief of the Hotel Committee of the Dallas County Medical Society that the delegates to the Southern Medical Association's meeting will say at the conclusion of the gathering that they have never enjoyed greater hospitality or more splendid hotel facilities than they found at Dallas.

Book Reviews

Diseases of the Bronchi, Lungs and Pleura. By Frederick T. Lord, M.D., Visiting Physician, Massachusetts General Hospital; Instructor in Medicine, Harvard Medical College. Second Edition. Thoroughly revised, with the addition of a chapter on Pulmonary Tuberculosis. Illustrated. Philadelphia and New York: Lea & Febiger, 1925.

This valuable contribution is well worth reading by the internist or general practitioner. Both the style and manner of presentation are good. The book presents much of the newer knowledge in the fields covered. Worthy of special mention are the chapters on atelectasis, bronchiectasis, and bronchial asthma, while the addition of a chapter on pulmonary tuberculosis is quite an important addition to this edition.

The acute conditions are also covered: the various forms of bronchitis, the pneumonias and pleuritis, as well as others all have chapters devoted to them.

The book is altogether admirable and is to be commended.

Books Received

The Practical Medicine Series, comprising eight volumes on the year's progress in medicine and surgery, Volume VIII, Series 1924. Chicago: The Year Book Publishers. Price this volume, $2.00. Price series of eight volumes, $15.00.

The Surgical Clinics of North America (Issued serially, one number every month). Volume V, Number II (New York Number—April 1925). 337 pages with 105 illustrations. Per clinic year (February 1925 to December 1925). Philadelphia and London: W. B. Saunders Company. Paper, $12.00. Cloth, $16.00 net.

A Manual of Physical Diagnosis. By Austin Flint, M.D., LL.D., Late Professor of the Principles and Practice of Medicine and of Clinical Medicine in Bellevue Hospital Medical College, Etc. Ninth Edition, Revised. 320 pages, illustrated. Philadelphia and New York: Lea and Febiger. Cloth, $3.00.

Aids to Physiology. By John Tait, M.D., D.Sc., Late Lecturer in Experimental Physiology, Edinburgh University, and R. A. Krause, M.D., D.Sc., Late Lecturer in Hygiene and Physiology, College of Hygiene and Physical Education, Dunfermline; Lecturer in Hygiene and Physiology, Heriot-Watt Technical College, Edinburgh. Second Edition. New York: Wm. Wood and Company. Cloth, $1.50.

The International Medical Annual. A Year Book of Treatment and Practitioner's Index. Forty-Third Year, 1925. 548 pages. New York: William Wood and Co. Cloth, $6.00.

New and Nonofficial Remedies, 1925, containing descriptions of the articles which stand accepted by the Council on Pharmacy and Chemistry of the American Medical Association on Jan. 1, 1925. Chicago: American Medical Association. Cloth, $1.50.

Manson's Tropical Diseases, A Manual of the Diseases of Warm Climates. Edited by Philip H. Manson-Bahr, D.S.O., M.A., M.D., D.T.M. and H. Cantab, F.R.C.P. Lond., Physician to the Hospital for Tropical Diseases, London, and the Albert Dock Hospital; Lecturer at the London School of Hygiene and Tropical Medicine; Lecturer on Tropical Diseases to the London Hospital; Consultant in Tropical Medicine to the Royal Air Force; Corresponding Member of the Societe de Pathologie Exotique; Examiner in Tropical Medicine to Cambridge University. Eighth Edition, Revised. 895 pages, Illustrated. New York: Wm. Wood and Company. Cloth, $11.00.

Anaphylaxis and Sensitization, With Special Reference to the Skin and its Diseases. By R. Cranston Low, M.D., F.R.C.P., Lecturer on Diseases of the Skin, Edinburgh University; Assistant Physician for Diseases of the Skin, Royal Infirmary, Edinburgh. 384 pages, with 16 colored plates and 7 half-tone illustrations. New York: Wm. Wood and Company. Cloth, $6.50.

A Compend of Genito-Urinary Diseases and Syphilis, including their surgery and treatment. By Charles S. Hirsch, M.D., Urologist to the Jewish Hospital, Mt. Sinai Hospital, and Eagleville Hospital for Consumptives, Out-Patient Department, Philadelphia. 323 pages. Fourth Edition, Revised, with 44 illustrations. Philadelphia: P. Blakiston's Son & Co. Cloth, $2.00 net.

Enzyme Intelligence and Whence and Whither, illustrating that enzymes and ferments are the ultimate indestructible and invisible units of life and are conscious and intelligent. That these units produce and maintain all living things we see. That our body is a republic established by enzymes coming from the invisible world of which we return when we die. By Nels Quevli. Lakefield, Minnesota: Standard Book Company. Cloth, $3.65.

The Personal Equation. By Louis Berman, M.D. 12mo, 304 pages. Illustrated. New York: The Century Company. Cloth, $2.50.

Diseases and Deformities of The Foot. By John Joseph Nutt, B.L., M.D., F.A.C.S., Professor of Orthopedic Surgery, Polyclinic Medical School and Hospital; Surgeon-in-Chief, New York State Orthopedic Hospital for Children; Orthopedic Surgeon, Willard Parker Hospital, Nyack Hospital and Rockland County Hospital; Member of the American Orthopedic Association. Second Edition completely revised. 309 pages. New York: E. B. Treat & Company. Cloth, $4.00.

The Practical Medicine Series, Comprising Eight Volumes on the Year's Progress in Medicine and Surgery. Volume V, under the General Editorial Charge of Charles L. Mix, A.M., M.D. Gynecology edited by Thomas J. Watkins, M.D., F.A.C.S., Professor of Gynecology, Northwestern University Medical School; Attending Gynecologist, St. Luke's Hospital, Chicago. Obstetrics edited by Joseph B. DeLee, A.M., M.D., Professor of Obstetrics, Northwestern University Medical School; Attending Obstetrician, Chicago Lying-In and Mercy Hospitals; Consulting Obstetrician, Provident and Evanston Hospitals. Chicago: Year Book Publishers. Cloth, $2.00. Price of series of eight volumes $15.00.

The Medical Clinics of North America (Issue Serially one number every other month.) Volume VIII, Number V, March 1925. (Boston Number.) Octavo of 247 pages and 21 illustrations. Per Clinic year (July 1924 to May 1925.) Philadelphia and London: W. B. Saunders Company. Paper, $12.00; Cloth, $16.00 net.

Gynecology for Nurses. By M. J. Seifert, A.B., M.D., F.A.C.S., Attending Surgeon and Gynecologist, Columbus Hospital, Chicago; Consulting Surgeon, St. Mary of Nazareth Hospital, Chicago; formerly Professor of Physical Diagnosis and Anesthesiology, University of Illinois; Adjunct Professor of Operative Surgery, University of Illinois; etc. 325 pages. New York and London: D. Appleton and Company, 1925.

An X-Ray Atlas of the Normal and Abnormal Structures of the Body. By Archibald McKendrick, F.R.C.S. (Edin.), D.P.H., F.R.S.E., Surgeon-in-Charge of the Surgical X-Ray Department, Royal Infirmary, Edinburgh; Examiner, Royal College of Surgeons, Edinburgh, and Charles R. Whittaker, F.R.C.S. (Edin), F.R.S.E., Assistant Lecturer on Anatomy, Surgeons' Hall, Edinburgh; Examiner, Royal College of Surgeons, Edinburgh. New York: William Wood & Co., 1925. Cloth, $10.00.

Personal Hygiene. The Rules for Right Living. By Allan J. McLaughlin, M.D.; Surgeon United States Public Health Service. New York: Funk & Wagnalls Co. Price per volume 30c net.

Southern Medical News

ALABAMA

Work has been started on the construction of a $100,000 addition to St. Vincent's Hospital, Birmingham.

The new hospital at Falls City will be completed in October. It will accommodate 125 patients and is owned by Dr. J. R. Snow.

A new building at the Huntsville Hospital, Huntsville, will soon be constructed at a cost of $141,000.

John D. Rockefeller, Tarrytown, N. Y., has given $1,000,000 in securities to the Hampton-Tuskegee endowment, bringing the fund to $4,500,000 of the $5,000,000 being sought. The money will be divided equally between the institution at Hampton, Va., and the other at Tuskegee. These are negro institutions.

Dr. John E. Garrison, Birmingham, after serving as obstetrician at the Salvation Army Hospital for more than thirteen years, has resigned.

Dr. Ellis Hewitt Edwards, Mulga, and Miss Lida Scott McCarty, Owensboro, Ky., were married June 2.

Deaths

Dr. Andrew LaFayette Gaston, Ensley, aged 41, died July 11 of heart disease.

Dr. William Andrew Eiland, Samson, aged 66, died May 30.

ARKANSAS

During the Golden Anniversary meeting of the Arkansas Medical Society at Little Rock in May, the Woman's Auxiliary of the Arkansas Medical Society was organized. The following officers were elected: Mrs. C. W. Garrison, Little Rock, President; Mrs. Dewell Gann, Sr., Benton, President-Elect; Mrs. Wm. R. Bathurst, Little Rock, Vice-President; Mrs. R. H. T. Mann, Texarkana, Recording Secretary; Mrs. T. G. Porter, Hazen, Treasurer.

Pulaski County Medical Society held a basket picnic and fish fry June 22, near Benton.

Dr. Leonard R. Ellis has been elected President of the Board of Health of Hot Springs National Park, and Dr. Austin F. Barr, Secretary.

Dr. Francis Michael Smith, Franklin, La., has been appointed Health Officer for Jefferson County.

Dr. Cecil Greer, Chicago, has been appointed Resident Physician of the Arkansas Boys' Industrial School, Pine Bluff.

Dr. Wm. F. Manglesdorf was recently appointed chief Chemist for the new Department of Conservation and Inspection, State Capitol, Little Rock.

Dr. Margaret M. Hoskins, Ph.D., has resigned as Professor of Microscopic Anatomy at the University of Arkansas School of Medicine, Little Rock, and will accept an appointment at the University and Bellevue Hospital Medical College, New York.

Mrs. Phoebe Martin has been appointed Superintendent of the Davis Hospital, Pine Bluff.

Dr. John T. Palmer has been reappointed to the State Board of Medical Examiners.

Dr. John C. Swindle, Walnut Ridge, was recently reappointed a member of the State Medical Examining Board.

Deaths

Dr. Percy W. Johns, Hot Springs National Park, aged 70, died June 23 at the Trinity Hospital, Little Rock.

Dr. Oliver Currie Struthers, Siloam Springs, aged 51, died June 8 at the U. S. Veterans' Hospital, Tucson, Ariz., of chronic nephritis.

Dr. Finis Ewing Jeffery, Desha, aged 69, died June 18 of heart disease.

DISTRICT OF COLUMBIA

The U. S. Public Health Service in cooperation with the District Health Officer, Dr. William C. Fowler, is making a survey of the waters of the Potomac River in the vicinity of Washington to determine what action, if any, may be taken to render the river safe for bathing. Among the subjects to be included in the survey are the engineering problems relating to the disposal of Washington sewage into the Potomac seven miles below Washington, the character of the small streams that flow into the Potomac and what pollution, if any, occurs, on such streams, and the fact that the Potomac at Washington is affected by ebb and flow of tide water.

A card party and dance for the aid of the free dispensary work at Providence Hospital, Washington, was recently given by the Social Service Department of the Hospital on the roof of the building.

Miss Lucy Minnigerode has been selected by the International Red Cross Committee as the American recipient of the Florence Nightingale medal. During the World War Miss Minnigerode was a member of the Red Cross unit assigned to Kiev, Russia, after which she became Director of the Nurse Corps of the U. S. Public Health Service. She is Chairman of the Delano Memorial Committee and a representative of the American Nursing Association on the Joint Congressional Committee.

Brig. Gen. James D. Glennan, Assistant Surgeon General of the Army, has received a silver star citation for gallantry in action against Sioux Indians in 1890.

Deaths

Dr. William H. Rand, Washington, aged 79, died June 21.

Dr. Oscar Henry Coumbe, Washington, died June 12.

FLORIDA

The State Board of Health held a clinic at Jacksonville, July 10-20, for the study of "creeping eruption" which was in charge of Dr. Joseph Lee Kirby-Smith and with whom was associated W. E. Dove, entomologist, and G. F. White, insect pathologist, both of the U. S. Bureau of Entomology.

The property of the Victoria Hospital, Miami, was sold recently at a sum approximating $100,000. Plans for the improvement of the property include the erection of a $700,000 hotel adjoining the hospital and an enlargement of the hospital to 106 beds. It is announced that the hotel will be for convalescents and others who wish to be under medical care without entering a hospital.

Dr. Henry Mason Smith, Tampa, has been appointed President of the State Board of Health to succeed Dr. Calvin T. Young, Plant City, whose commission recently expired. The other members of the Board are: Dr. William D. Nobles, Pensacola, and Charles H. Mann, Jacksonville.

Miss Bertha Parks has been appointed Superintendent of the Lee Memorial Hospital, Fort Myers.

Dr. Kenneth Alexander Morris, Jacksonville, and Miss Mildred Lockwood Pool, New Orleans, La., were married June 16.

Deaths

Dr. George Fraser Wilson, Miami, aged 46, died June 12 at the Johns Hopkins Hospital, Baltimore, Md.

Dr. Archibald Cuning Livingston, Pensacola, aged 49, died June 6 at Tampa.

Dr. Homer C. Noble, Sanford, aged 73, died May 22.

GEORGIA

The 25th annual meeting of the Chattahoochee Valley Medical and Surgical Association was held in Warm Springs, July 14-15.

The Association of Prison Physicians of Georgia held its annual meeting in May. Dr. H. M. Fullilove, Athens, was elected President; Dr. T. S. Bailey, Newman, Vice-President; Dr. M. M. Head, Secretary-Treasurer.

New officers of the Woman's Auxiliary to the Medical Association of Georgia are Mrs. W. H. Myers, Savannah, President; Mrs. A. J. Mooney, Statesboro, Secretary.

Meriwether County Medical Society has elected Dr. J. W. Johnson, Manchester, President; Dr. P. H. Bennett, Gay, Vice-President; Dr. R. B. Gilbert, Greenville, Acting Secretary-Treasurer.

Muscogee County Medical Society has elected Dr. W. P. Jordan, Columbus, President; Dr. J. C. Wooldridge, Columbus, Vice-President; Dr. F. B. Blackmar, Columbus, Secretary-Treasurer.

Taliaferro County Medical Society has elected Dr. John A. Rhodes, Crawfordville, President; Dr. Thomas C. Nash, Philomath, Vice-President; Dr. Alex H. Beazley, Crawfordville, Secretary-Treasurer.

Twiggs County Medical Society has elected Dr. T. S. Jones, Jeffersonville, President; Dr. H. A. Rogers, Jeffersonville, Secretary-Treasurer.

The new contagious disease unit of the Grady Hospital, Atlanta, has been completed and was opened in July.

The John D. Archbold Memorial Hospital, Thomasville, was dedicated June 13. This hospital was presented by John F. Archbold as a memorial to his father. Col. James L. Bevans, M. C., U. S. Army, retired, is the Director.

Dr. William S. Elkin, for seventeen years Dean of the Emory University School of Medicine, Atlanta, has tendered his resignation and has been elected Emeritus Dean and Emeritus Professor of Obstetrics and Gynecology. Dr. Elkin has been connected with this school, now known as the School of Medicine of Emory University, for forty-three years. Dr. Russell H. Oppenheimer, an alumnus of the University Medical School, succeeds Dr. Elkin as Dean.

Dr. M. E. Winchester, Thomasville, and Dr. C. L. Ridley, Macon, have had the degree of Doctor of Public Health conferred upon them. Dr. Winchester is Health Commissioner of Thomas County and Dr. Ridley is Health Officer of Bibb County.

Drs. Eugene E. Murphey and H. W. Shaw has been selected to appear before the Augusta Council to assist in appropriating $6000 to pay for public health nurses for Augusta.

Dr. Obie B. Walker, who has been on the Board of Medical Examiners since 1913, has been reappointed for a term of four years.

Dr. A. B. Jemison, Macon, has gone to Milledgeville and is with the Georgia Military College at that place.

Dr. Harold L. Reynolds and Miss Mary Elizabeth Sims, both of Athens, were married June 22.

Dr. Frank M. Hand and Miss Muriel Downer, both of Atlanta, were married June 1.

Deaths

Dr. Delmar Turner, Jr., Savannah, aged 47, died June 23.

Dr. O. W. Turner, Helena, aged 81, died June 16 following a long illness.

Dr. David N. Hardin, Sutallee, aged 81, died June 16.
Dr. C. D. Redding, Sparta, aged 63, died June 24.

KENTUCKY

The Kentucky Society for Crippled Children is conducting a drive to raise $100,000 for the care of crippled children within the next year. The State Legislature appropriated $10,000 for the work of the Society which became available July 1. It is reported that 115 children examined at the nine clinics held in various sections of the state this summer have been placed in hospitals for treatment.

Dr. S. C. Smith has been appointed Chief Surgeon at the Methodist Hospital, Pikeville, succeeding Dr. William C. Gardner, resigned.

Dr. H. A. Bolton has been appointed Superintendent for the State Hospital for the Insane, Warmspring, Mont.

Dr. William M. Elliott, Lancaster, has been appointed Superintendent of the Central States Hospital, Lakeland. He succeeds Dr. Walter A. Jillson, resigned.

Dr. Floyd P. Allen, formerly of Ann Arbor, Mich., has assumed the duties of Health Officer of Paducah.

Dr. Edward P. Guerrant, Winchester, and Miss Lucy Branaman, Lexington, were married June 22.

Dr. Robert Lovell Samuel and Miss Ada Rubenacker, both of Maysville, were married in June.

Dr. Robert Julian Estill, Lexington, and Mrs. Elizabeth Hinton, Cincinnati, Ohio, were married June 6.

Deaths

Dr. Hugo W. Aufmwasser, Covington, aged 55, died July 6 at St. Elizabeth's Hospital.

Dr. Benjamin E. Gore, Bardstown, aged 68, died May 31 of heart disease.

Dr. Robert Lee Ford, Livermore, aged 54, died June 9.

Dr. Charles Augustine Covell, Syracuse, aged 65, died June 12.

Dr. William M. Bailey, Bowling Green, aged 90, died May 23 of senility.

LOUISIANA

The Board of Administrators of the Tulane University of Louisiana will reorganize the Graduate School of Medicine so as to meet more fully the recommendations of the Council on Medical Education of the American Medical Association. A committee has been appointed to work out the plans of reorganization, and it is thought that the school will be fully organized and ready for work by the beginning of the 1925-1926 college year.

At a recent state conference of health officers in New Orleans, resolutions were passed recommending that health boards try to secure compulsory vaccination of school children and that laws be provided to prevent the spread of rabies by vaccination of dogs.

The Superintendent of the new Southern Baptist Hospital, New Orleans, the first unit of which will have a capacity of 150 beds and be open to receive patients by January 1, 1926, has announced the following appointments: Dr. Carroll W. Allen, to head the Department of Surgery; Dr. Oscar W. Bethea, Medicine; Dr. John T. O'Ferrall, Orthopedics; Dr. Thomas B. Sellers, Gynecology and Obstetrics; Dr. Henry W. E. Walther, Urology; Dr. Charles S. Holbrook, Neuropsychiatry; Dr. Rena Crawford, Pediatrics; Dr. James P. O'Kelly, Otorhinolaryngology; Dr. Victor C. Smith, Ophthalmology, and Dr. Ansel M. Caine, Anesthesia.

The Baptist Hospital, New Orleans, will have a nurses' home which will be constructed at an approximate cost of $92,000. Work will begin at once and when completed, the building will accommodate 120 nurses.

Mrs. William H. Dielman, New Orleans, has made a gift of a building for epileptic patients to be erected on land owned by the Home for Incurables. The building will cost more than $30,000 and is to be a memorial to Mrs. Dielman's daughter, who died four years ago.

Dr. Joseph O. Weilbeacher, New Orleans, succeeds Dr. Leonard C. Chamberlain as Physican to the Police Department.

Dr. Samuel Elder has been promoted to Senior House Surgeon of Charity Hospital, New Orleans, and Dr. R. O. Russell has been named Senior House Physician. They succeeded Drs. E. L. Irwin and I. L. Robbins, who will enter private practice. Dr. Martin Miller has been made House Surgeon; Dr. W. H. Cook, Assistant House Surgeon; Dr. B. D. Corrington, Junior House Physician.

Dr. Alexander J. Azar has resigned from the teaching staff of Tulane University and will engage in private practice.

Dr. Kosta Drensky, of Bulgaria, Fellow of the International Health Board, was a recent visitor to New Orleans and other places in the state to inspect the anti-malaria work. He has been assigned to anti-malaria work in Bulgaria.

Dr. Clarence Prentice May, New Orleans, and Miss Millicent Halsey, Germantown, Pa., were married June 25.

Dr. Euclid Borland Gill and Miss Mary Munholland, both of New Orleans, were married recently.

Deaths

Dr. Robert J. Mainegra, Sr., New Orleans, aged 83, died recently.

Dr. Louis Theophile Donaldson, Sr., Reverse, aged 71, died July 15.

Dr. Jonathan Joseph Peters, Winnfield, aged 72, died suddenly June 29 of cerebral embolism.

Dr. Hugh Wilson Sweeney, Monroe, aged 42, died May 10 of heart disease.

Dr. Ralph Oliver Hollister, Hammond, aged 62, died June 7.

Dr. George C. Babcock, Lafayette, died recently.

Dr. August J. Pareti, New Orleans, aged 35, died July 2.

MARYLAND

The Frederick County Branch of the Maryland Tuberculosis Association was formed at a special meeting and luncheon held at Frederick, May 4. The organization will function throughout the year, and will support the Tuberculosis Clinics, the Modern Health Crusade and other activities of the campaign against tuberculosis.

The State Department of Health has extended its facilities until it is possible for every physician to have the assistance of the laboratory in the treatment of his cases. There is a central laboratory at the State Department of Health offices in Baltimore and branch laboratories at Cumberland, Hagerstown and Frederick for counties along the northern border; at Hurlock for the eastern shore counties, and a branch at the Hygienic Laboratory in Washington for counties in southern Maryland. No charge is made to physicians for services in any of these laboratories.

The hospital unit planned for the Hebrew Hospital and Asylum, when completed and equipped will represent an investment of more than $1,000,000. It will be an eight-story building and will add 105 rooms to the hospital and accommodate 40 persons in the Home for the Aged, making the total number of hospital beds more than 300. The plans include remodeling the Frank Building, the top floor of which will be known as the Nathan and Gertrude Rohr Memorial and will contain 28 beds for children. The number of beds in the building will be 111.

A number of dogs have been reported as having rabies in the vicinity of Towson, and one woman died from rabies after having been bitten, and because of this the Deputy State Health Officer of Towson, Dr. Josiah S. Bowen, has issued orders to shoot on sight any dog within a specified area in Baltimore County unless the dog is leashed.

Two fellowships in plastic surgery have been established at Johns Hopkins Medical School, each of three years' tenure, by the General Education Board of New York. The fellowships are the first of their kind established in this country, and are open to doctors of medicine who have shown ability as students. A fund of $50,000 has been established by James Speyer to facilitate visits to Johns Hopkins University by distinguished scientists connected with the departments of the natural sciences of the universities of Germany.

A community public health meeting, the first of its kind, was held in Cumberland June 28. Dr. Joseph C. Bloodgood, Baltimore, spoke on "Cancer: A Preventable and Curable Disease." About 5000 people heard the lecture with the aid of amplifiers in an open-air auditorium.

A campaign to raise $1,500,000 for the endowment of the Johns Hopkins Children's Fund will be launched in Baltimore early in October under the auspices of the Johns Hopkins Half-Century Committee. The fund is to provide for the free care of sick and crippled children in Baltimore. One hundred and thirteen thousand dollars is spent annually by the Department for Children at the John Hopkins Hospital, of which $80,000 is devoted to the treatment of needy children. About $65,000 of this amount has been coming from the general income of the Hospital and a gift of $700,000 from the General Education Board. The gift which

(Continued on page 34)

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(Continued from page 706)

was intended for a building project can no longer be used for the children's fund. The Hospital, operating at a deficit, can no longer make its contribution.

The new medical research building at the Eudowood Sanatorium, Towson, which cost about $90,000, with an additional $20,000 for equipment, was dedicated May 30. The building contains laboratories, hydrotherapy department, operating room, space for 150 beds, ten private rooms and sleeping porches. Funds for this work were obtained by popular subscription in 1923.

The Commissioners of Washington County have asked that the new branch of the Sykesville Hospital for the Insane be built in Washington County.

William W. Cort, Ph.D., Associate Professor of Helminthology, Department of Medical Zoology, School of Hygiene and Public Health, Johns Hopkins University, Baltimore, was recently promoted to a professorship of Helminthology.

Dr. William S. Love, Jr., a member of the staff of the University Hospital, has been appointed as Assistant in Medicine in the Lewis Clinic at the University Hospital School, London. His appointment will become effective for one year from October 1.

Dr. George Lane Taneyhill, Jr., Baltimore, and Miss Marguerite Guard McAllister, New York, were married June 25.

Deaths

Dr. Henry M. Thomas, Baltimore, aged 64, died June 21 at his country home at Blue Ridge Summit, Pa., of heart disease.

Dr. George French Owens, Chaptico, aged 52, died May 17.

Dr. Thomas Wattes Byerly, Laurel, aged 57, died June 15.

Dr. Richard Thomas Hardy, Baltimore, aged 70, died June 6 of heart disease.

MISSISSIPPI

The Homochitto Valley Medical Society held its quarterly meeting July 9.

The Board of Supervisors held a meeting at Clarksdale

(Continued on page 36)

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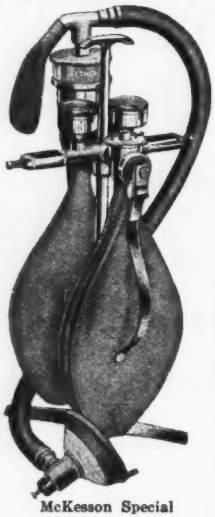

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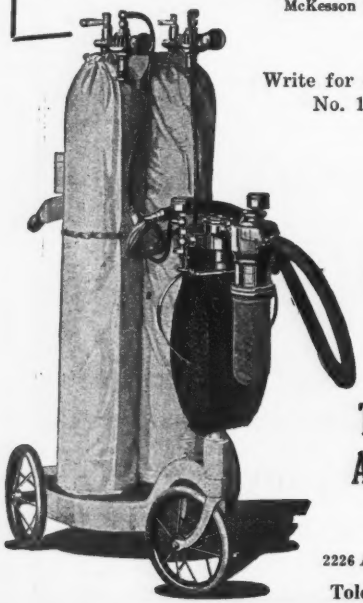

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(Continued from page 34)

July 6 and voted to combine with the County Health Office and the Clarksdale Health Unit, thus giving the County Health Officer control over the health situation in Coahoma County. Dr. Robert R. Kirkpatrick will be the County Health Officer.

Dr. John Spellman, Medical Superintendent of the Touro Infirmary, New Orleans, recently made a survey of the Natchez Hospital for the purpose of making recommendations regarding the standardization of the institution.

Dr. A. S. Applewhite, Jackson, is in charge of the Health Unit of LeFlore County.

Dr. William W. Reynolds has been appointed County Health Officer of Lauderdale County, succeeding Dr. Inman W. Cooper, resigned.

Drs. John F. Chamberlain and James Rice, Natchez, will soon erect a private hospital. It will be known as the Rice-Chamberlain Hospital, and will have a capacity of about 65 beds.

Dr. Milton W. Robertson, Rienzi, succeeds Dr. James S. Voyles as Health Officer of Alcorn County.

Dr. J. S. Ullman, Natchez, has been elected to membership in the American Radium Society.

Dr. Hall H. Ratcliff and Miss Mary Louise Richardson, both of Natchez, were married June 11.

Deaths

Dr. W. J. Knox, Ingomar, aged 59, died in June of arteriosclerosis and chronic interstitial nephritis.

Dr. James Patrick Moore, Jr., Yazoo City, aged 58, died June 25 at a sanatorium in Cincinnati as a result of injuries received in a fall several years ago.

(Continued on page 38)

Kansas City Annual
FALL CLINICAL CONFERENCE
Kansas City, Mo., October 5, 6, 7, 8, 9, 1925

A real post-graduate course, in lecture and clinic, by eminent specialists, demonstrating the progress in medicine and surgery during the past year. Operative and diagnostic clinics at all allied hospitals in Greater Kansas City. Lectures and exhibits in the Kansas City Athletic Club building—full club privileges available to all visiting physicians.

A constructive program which should prove of lasting benefit. The following distinguished guests will speak:

Dr. Isaac A. Abt.....Pediatrics
Chicago, Ill.
Dr. B. S. Barringer.....Urology
New York City
Dr. Roy B. Canfield.....Ear, Nose and Throat
Ann Arbor, Mich.
Dr. R. C. Coffey.....Surgery
Portland, Ore.
Dr. Arial W. George.....Radiology
Boston, Mass.
Dr. Russell A. Hibbs.....Orthopedics
New York City
Dr. Chas. F. Hoover.....Medicine
Cleveland, Ohio
Dr. Alexander Lambert.....Medicine
New York City
Dr. W. J. Mayo.....Surgery
Rochester, Minn.
Dr. John Osborne Polak.....Obstetrics
Brooklyn, N. Y.
Dr. John Elmer Weeks.....Eyes
New York City
Dr. T. W. Salmon.....Neurology
New York City

DAILY CLINICAL BULLETIN published the year round, listing medical and surgical work in hospitals and offices of doctors in Greater Kansas City. Visiting physicians may secure this bulletin any time at Union Station or any hospital.

KANSAS CITY CLINICAL SOCIETY
631 Rialto Bldg. KANSAS CITY, MO.
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Tempting the Convalescents appetite

THE appetite of the convalescent patient is a "finicky" thing—it tires so easily of the foods that the patient needs to build him up.

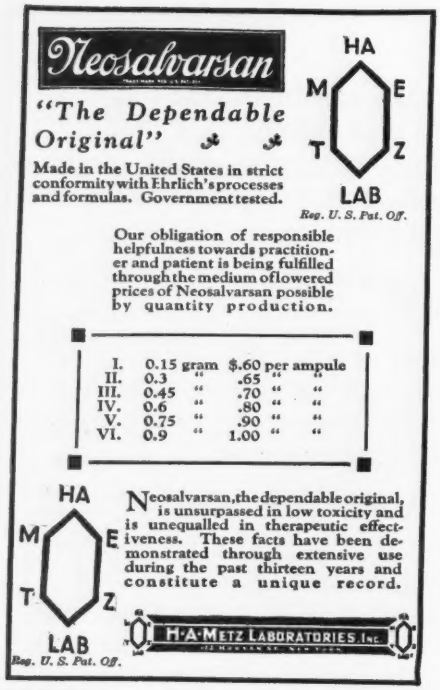
Knox Sparkling Gelatine combines with the necessary foods—milk, eggs, vegetables, fruit juices and broths—and makes an almost endless variety of delightfully dainty dishes.

And recent laboratory tests have shown that gelatine preparations, because of their ease of digestion and their real food value, actually improve the general physical condition of the patient.

To safeguard against impurity and disturbing acidity, it is essential to specify Knox Sparkling Gelatine, the Highest Quality for Health.

A number of special recipes for convalescents have been prepared by a recognized authority and will be sent free to doctors and hospitals upon request. Address the Knox Gelatine Laboratories, 408 Knox Avenue, Johnstown, N. Y.

Note: From the raw material to the finished package, the Family of Knox takes pride in producing the highest quality of gelatine.


Neosalvarsan
"The Dependable Original"
Made in the United States in strict conformity with Ehrlich's processes and formulas. Government tested.
HA
M E
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Reg. U. S. Pat. Off.
Our obligation of responsible helpfulness towards practitioner and patient is being fulfilled through the medium of lowered prices of Neosalvarsan possible by quantity production.
I. 0.15 gram $.60 per ampule
II. 0.3 " .65 " "
III. 0.45 " .70 " "
IV. 0.6 " .80 " "
V. 0.75 " .90 " "
VI. 0.9 " 1.00 " "
HA
M E
T Z
LAB
Reg. U. S. Pat. Off.
Neosalvarsan, the dependable original, is unsurpassed in low toxicity and is unequalled in therapeutic effectiveness. These facts have been demonstrated through extensive use during the past thirteen years and constitute a unique record.
H·A·METZ LABORATORIES, Inc.

(Continued from page 36)

Dr. McDonald Watkins, Natchez, aged 51, died June 19.
Dr. Marion P. Winkler, Tchula, aged 55, died May 17.

MISSOURI

The third annual fall clinical conference will be held October 5-9, Kansas City. Clinics have been arranged at all allied hospitals in greater Kansas City.

The St. Louis Eye, Ear, Nose and Throat Infirmary has donated to the St. Louis Medical Society almost $3500 in securities, to be known as the St. Louis Eye, Ear, Nose and Throat Infirmary Fund. The income from this will be used equally to maintain the libraries of the Departments of Ophthalmology and Otolaryngology. The Infirmary also gave to the St. Louis Medical Society $350 in Liberty Bonds to aid in the completion of the Medical Library Building.

An eight-bed hospital at Unionville was recently opened by Dr. Cyril P. Vores. The building contains fifteen rooms. Efforts to establish a county hospital in Putnam County have failed, and if they are not successful soon, Dr. Vores will increase the capacity of his hospital.

Plans are being made to construct a new state trachoma hospital at Poplar Bluff. The plans provide for accommodation of fifty patients.

St. John's Hospital, Joplin, will have a new addition. It will be a brick structure two stories high.

The following promotions have been made at the St. Louis University School of Medicine: Dr. Wm. W. Graves, Chairman of the Department of Neurology for a number of years, has been appointed Director of the Department; Drs. Louis Rassieur and Max W. Myer, Assistant Professors of Surgery, have been advanced to Professors of Surgery; Dr. Charles F. Sherwin from Instructor in Surgery to Assistant Professor of Surgery; Dr. Harvey D. Lamb, from Instructor in Ophthalmology to Assistant Professor.

The Public Health Laboratory service was discontinued July 1 because of shortage of funds available for the maintenance of the State University during the current biennial period. The State Board of Health maintains at Jefferson City a laboratory to which material formerly sent to the

(Continued on page 40)

REST RECREATION RECUPERATION

Hot Springs National Park, Arkansas

"America's National Health Resort"

(Under the control of the Interior Department)

The attention of the American Medical Profession is invited to the great benefits to be derived from the use of the radio-active waters of Hot Springs in the treatment of diseases where rapid elimination is desired such as, arthritis, neuritis, malaria, affections of the skin and other diseases resulting from toxemias and microbic infection.

The resort is provided with a number of modern and luxurious bath houses, hotels, apartments and boarding houses.

Pleasures and amusements in the way of golf, tennis, mountain climbing, horseback riding, fishing and hunting are provided for our guests and visitors.

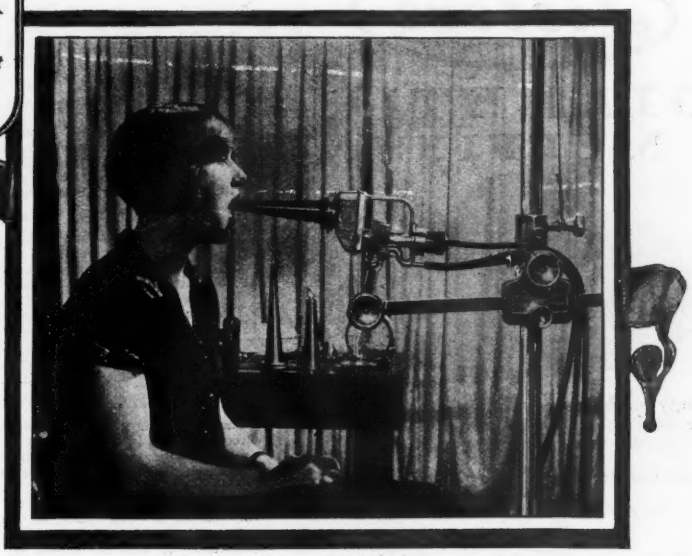
For further information write—

Medical Intelligence Bureau

Box 886

Hot Springs National Park, Arkansas

HANOVIA
Pioneer in Quartz Light Therapy



FOR THROAT AND ORAL INFECTIONS

Quartz Light is a widely accepted modality for the treating of throat and oral infections, such as Tubercular and non-specific Laryngitis, Tonsillar infections, Hyperesthetic Rhinitis, Bronchial Asthma, Hay Fever, Stomatitis, Gingivitis, Pyorrhea and post-operative conditions.

Such treatments are rendered particularly effective by the Wagner Prismatic and Ashland Universal quartz applicators, adapted to the KROMAYER LAMP — permitting the greatest concentration of ultra violet rays with the utmost convenience in handling.

The KROMAYER LAMP is especially and scientifically designed to meet those various conditions confronted by the physician in his everyday practice. While the entire quartz mercury anode type burner insures maximum intensity of rays, longer life and lower operating cost.

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Special Literature Request

HANOVIA CHEMICAL & MFG. CO. Chestnut St. & N. J. R. R. Ave. Newark, N. J.

Gentlemen:

Please send me, without obligation, special data and reprints upon the treatment of throat and oral infections with Quartz Light.

38 Dr.

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Listers

DIABETIC MUFFINS

Easily made in any home from *Listers* prepared casein Diabetic Flour. (Self-rising) Strictly free from Starch and Sugar.

Large Carton Flour *(30 days' supply)* $4.85

May be purchased from leading druggists or direct from

LISTER BROS., Inc. 405 Lexington Ave. NEW YORK CITY

(Continued from page 38)

Public Health Laboratory should be sent for examination in future.

Dr. Cortez F. Enloe, Jefferson City, has been reappointed Director of the Board of Penal Institutions for a term ending June 19, 1929.

Dr. Willard Bartlett, St. Louis, has had conferred on him the honorary degree of D.Sc. by his alma mater, Illinois College.

Dr. John R. Caulk, St. Louis, was elected President of the American Urological Association at the recent meeting in St. Louis.

Dr. Thomas A. Kyner, Kansas City, succeeds Dr. John M. Frankenburger, as Superintendent of the General Hospital. Dr. Frankenburger resigned because of ill health.

Dr. George A. Manting and Miss Lillian Neubarth, both of St. Louis, were married June 30.

Deaths

Dr. Alexander Chambers Gibson, Kansas City, aged 86, died July 5 of pneumonia.

Dr. Harry Daigh Carley, St. Louis, aged 52, died June 21 at the Missouri Baptist Sanitarium.

Dr. David A. Dyer, St. Louis, aged 68, died June 13.

Dr. Dennis E. Wilhelm, Kansas City, aged 41, died June 15 at the U. S. Veterans' Hospital.

Dr. Senter Lee Gettys, St. Louis, aged 50, died at St. Luke's Hospital, June 6 of nephritis.

NORTH CAROLINA

Improvements at U. S. Veterans' Bureau Hospital No. 60, Oteen, will begin at once. A permanent mess hall, kitchen, and diet kitchens will be built this year, and next year a diagnostic building and additional quarters. Most of the construction at this hospital built during the World War was temporary; beginninig in 1920, the Government has constructed all new work along permanent lines.

The Maria Parham Hospital was opened at Henderson recently. It will be conducted by members of the local medical profession as a general hospital.

(Continued on page 42)

For Complete Sterilization

Indestructible Sterilizers

THE PELTON & CRANE CO. DETROIT, MICH.

Basic Facts About KLIM in Infant Feeding

KLIM is whole milk—pure and uniform—from which the water has been removed. In it the nutritive properties of fresh cow's milk are retained in highly assimilative form. It is the basis for safe and simplified infant feeding and so closely conserves the flavor and the natural properties of milk that it is the ideal milk for the growing child.

Analysis of

KLIM

POWDERED WHOLE MILK

	Dry	Liquid *
BUTTERFAT	28.00%	3.33%
CASEIN	21.28%	2.53%
ALBUMIN	5.46%	.65%
LACTOSE	38.00%	4.53%
ASH	5.76%	.69%
WATER	1.50%	88.27%
CALORIES (per ounce)	149.	18.

* 4½ Ounces to a quart of water

KLIM is completely soluble in water of any temperature

When Used in Infant Feeding

Reliquified KLIM at normal strength has the same analysis and caloric value as natural whole cow's milk and is subject to the same modifications when used in infant feeding

Recognizing the importance of scientific control, all contact with the laity is predicated on the policy that KLIM be used in infant feeding only according to a physician's formula.

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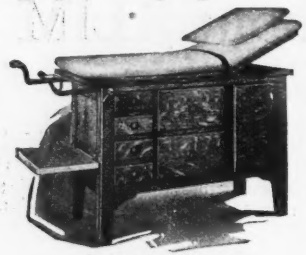
Also Makers of Merrell-Soule Powdered Protein Milk

In Canada KLIM and Merrell-Soule Powdered Protein Milk are made by Canadian Milk Products, Ltd., 347 Adelaide Street, West, Toronto

Physicians' Equipment

ASK ANY OWNER



Rochester Table

The Merit of the "ALLISON LINE" has been censored, approved, recommended by those best able to judge—its users.

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931 No. Alabama St. Indianapolis

PRINCIPAL AGENCIES:
736 So. Flower St., Los Angeles
110 E. 23rd St., New York
84 E. Randolph St., Chicago

(Continued from page 40)

According to recent announcements, the new building to house the Highsmith Hospital, Fayetteville, will be completed by November.

A new brick fireproof addition of thirty rooms will be added to the Lincoln Hospital, Lincolnton. This will increase the capacity to sixty rooms.

The Jane Wilkes Memorial Annex to the Good Samaritan Hospital (colored), Charlotte, was opened in June.

The cornerstone of the new Memorial Hospital, Kinston, "dedicated as a memorial to the soldiers and sailors of the World War from Lenoir County," was laid June 12.

Mr. B. N. Duke has donated $15,000 to construct a ward of ten beds for crippled negro children at the North Carolina State Orthopedic Hospital, Gastonia.

Dr. Albert DeK. Parrott, Kinston, has purchased nine-tenths of the stock of the Parrott Memorial Hospital, Kinston. Dr. James M. Parrott, surgeon, will continue as attending surgeon.

Dr. Charles B. McNairy, Superintendent, and Dr. William A. Newbold, Psychiatrist, at the North Carolina State Training School for Feeble-Minded, Kinston, have resigned. Dr. William H. Dixon, Ayden, has been elected Superintendent.

The following have been reappointed members of the State Board of Health for terms of six years: Dr. Richard H. Lewis, Raleigh, and E. J. Tucker, D.D.S., Roxboro. Dr. Lewis was originally appointed in 1884, since then he has been continuously a member of the Board and Secretary from 1892 to 1909. Dr. Tucker was appointed six years ago.

Dr. Elizabeth Delia Dixon Carroll, Raleigh, has been reappointed a Trustee for the State Home and Industrial School for Women and Girls, Samarcand.

Deaths

Dr. John Henry Harris, Franklinton, aged 61, died June 13 at the Sarah Leigh Hospital, Norfolk, Va.

Dr. George Beard Roberson, Greensboro, aged 45, died June 24 of cerebral hemorrhage.

Dr. Edmund Strudwick Ashe, Wadesboro, aged 67, died May 24.

(Continued on page 44)

The Patient Who Will Not Gain

Presents a Difficult Problem.

Prescribe **DRYCO** The Safe Milk

PHYSICIANS REPORT GAINS WITH DRYCO IN PATIENTS WHO HAVE NOT PREVIOUSLY RESPONDED TO OTHER FORMS OF MILK OR FOOD.

Dryco is the pure solids of fresh cow's milk in dry form and is adaptable to any dilution or modification. It can be digested and assimilated when other forms of milk are not tolerated and will be found of especial value in the feeding of mal-nourished and underweight cases.

Samples and Literature on Request.

To save time, tear out this advertisement, pin to your Rx blank and mail to

The Dry Milk Company 18 Park Row, New York, N. Y.

"An International Institution for the Study and Production of Pure Milk Products."

Figure It Out For Yourself

Who will suffer the loss of a malpractice action? Who will pay your judgment?

If you do not carry protection you must employ your own attorneys at a fee that would probably pay the premium on a Medical Protective Contract for many years. You will lose time—gain undesirable notoriety—lose money—impair your working efficiency by worry and in the end you may lose and be obliged to pay a judgment—which means a blow to your home, bank account, good name and practice.

Will you continue to expose all that you possess to some disgruntled patient, or will you be prepared for the emergency when it arises by having a Medical Protective Contract?

The cost is small but the satisfaction great.

For Medical Protective Service have a Medical Protective Contract

THE
MEDICAL PROTECTIVE COMPANY
OF
FORT WAYNE, INDIANA

(Continued from page 42)

Dr. Arthur Bascom Croom, Maxton, aged 45, died June 15.
Dr. William Watson Pharr, Charlotte, aged 69, died July 4.

OKLAHOMA

Beckham County Medical Society has elected Dr. V. C. Tisdal, Elk City, President; Dr. W. D. Oliver, Erick, Secretary. Both were re-elected.

The Hayden-Carroll Private Hospital, Tulsa, was opened recently. Dr. Elmer Forrest Hayden will be in charge.

Dr. A. J. Weedn, Duncan, is erecting a new modern two-story hospital. It will have forty rooms.

Ottawa County Medical Society has purchased a camp resort on the Elk River. Its meetings will be held there in future and the resort will be used as an outing place for their families.

Dr. H. C. Manning, Cushing, has leased the Cushing Municipal Hospital for another year.

Dr. Fred S. Clinton, Tulsa, was elected President of the Medical and Surgical Society of the Santa Fe Railway at their recent meeting in Denver, Colo.

Dr. E. W. Reynolds, Bristow, has been elected City Physician, to succeed Dr. O. C. Coppedge.

Deaths

Dr. David White, Antlers, aged 65, died June 22 of nephritis.

Dr. Daniel W. Humphrey, Sperry, aged 68, died June 16 of heart disease.

Dr. Daniel Wilson Humphrey, Oilton, aged 68, died June 16.

SOUTH CAROLINA

Alexander Long, Sr., cotton executive, has donated property for the site of a city hospital, Rock Hill.

Drs. Frank M. Lander, Williamston, and Joseph T. Taylor, Adams Run, have been appointed members of the State Board of Medical Examiners.

(Continued on page 46)

Hard-to-Please Appetites

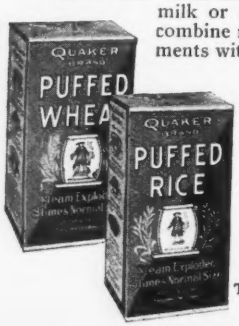
Respond *quickly* and remarkably to these unique grain foods

WHEN ordinary foods fail to tempt, and building foods are indicated, Doctor, may we suggest Quaker Puffed Wheat and Puffed Rice?

They are as different from ordinary cereals as one food can be from another. They taste like nutmeats, are as enticing as confections, and prove that food that's "good for you" can be delicious, too.

The Puffed Wheat contains 25% of bran. Digestion is made easy, for each grain is steam-puffed to 8 times normal size and every food cell broken.

Serve with "half and half" or with milk or cream, and thus combine needed grain elements with vitamines while attaining an important increase in milk ration.



Try them, please, in your next "appetite" case. You will be astonished at how well they take.

THE QUAKER OATS COMPANY

The "MESCO" Laboratories manufacture the largest line of Ointments in the world. Sixty different kinds. We are originators of the Professional Package. Specify "MESCO" when prescribing Ointments. Send for lists.

Manhattan Eye Salve Company

Louisville, Ky.

AMERICAN COD LIVER OIL

For many years the fishing industry has flourished along our shores but until recent years the production of medicinal cod liver was left almost entirely to the European manufacturers.

No better cod-fish swim anywhere than are found off our North American coast. After much research work and experimentation a method of making cod liver oil from the fresh livers of these fish has been developed.

Today American cod liver oil stands "ace-high." Clinical experience has confirmed our laboratory tests. It has been found that this oil is extremely potent in the fat-soluble vitamins.

The therapeutic value of PATCH'S FLAVORED COD LIVER OIL has been demonstrated in the many clinical tests where it has been used. Its value in rachitis and mal-nutrition is well established. It has been accepted for N. N. R. by the Council on Pharmacy and Chemistry of the A. M. A.

In addition to our carefully controlled manufacturing methods we further safeguard the physician who is depending upon our oil for definite results by biologically testing every lot of oil made in our plants. The vitamin potency is guaranteed.

If you are looking for a dependable, palatable and potent cod liver oil, send the coupon below for a trial bottle with descriptive literature.

PATCH'S FLAVORED COD LIVER OIL

Important Facts.

Made in our plants at the shore from FRESH LIVERS by modern, carefully controlled methods.

Not chemically refined.

Each lot biologically tested in our research laboratory. Vitamin potency guaranteed.

Pleasingly palatable, slightly flavored to leave a pleasant after-taste.

Supplied in 4 ounce and one pint, sealed, amber bottles only. Never sold in bulk.

The dose is small,—one-half teaspoon for children, one teaspoon for adults.

TASTE IT! YOU'LL BE SURPRISED!

THE E. L. PATCH CO.
Stoneham 80
BOSTON, MASS.

See our Exhibit at Dallas, November 9-12.

THE E. L. PATCH CO., Stoneham, 80, Boston, Mass.

Send me a sample of Patch's Flavored Cod Liver Oil with literature concerning its vitamin potency.

Dr.....

Street and No.....

City and State.....S.M.-S.

Euresol

(aceto-resorcin)

For the scalp—in dandruff and falling hair—prescribe

Euresol ..... ℥ii
Spirit. odor. ..... ℥ii
Spirit. vini. ..... ℥iv
Aq. dest. .....*ad.* ℥viii

E. Kromayer.

To be rubbed into scalp every other day.

Samples and literature from

E. BILHUBER, INC.

25 West Broadway **New York**

(Continued from page 44)

Dr. Thomas Grange Simons, Professor of Materia Medica, Medical College of the State of South Carolina, received the degree of Doctor of Laws from the College of Charleston at its recent commencement.

Dr. Francis N. Andrews has been elected County Health Officer for Marion County, succeeding Dr. Wallace L. Poole, who has gone to Daffney to take up similar work.

Deaths

Dr. James Edward Edwards, Spartanburg, aged 47, died recently.

Dr. Eugene Graham, Ruffin, aged 37, died June 25.

Dr. Charles Simmons Foster, Chester, aged 35, died May 21 of acute dilatation of the heart.

Dr. Norman Bruce Edgerton, Columbia, aged 38, died June 16 of pneumonia.

TENNESSEE

The Trustees of the University of Tennessee have approved the contract for the first series of buildings for the medical college to be erected in Memphis. The building will cost approximately $350,000 and will be the first step in the expansion program of the medical school made possible by recent legislation, and will house the departments of anatomy, chemistry and physiology.

Dayton has voted to contribute $30,000 to construct the Rena Clark Haggard Memorial Hospital, for which Mr. Haggard donated $40,000. The City will name one of the three trustees.

An addition will be built to the Shelby County Hospital to relieve the overcrowded condition until the proposed new $1,500,000 county hospital can be built. Sixty-five patients in excess of the 100 are being cared for.

St. Joseph's Hospital, Memphis, is building an addition which will cost $400,000. This will provide 150 private rooms, offices and two operating rooms.

Unicoi County Medical Society is planning to erect a hospital in Erwin.

Dr. Arthur W. Wright, Boston City Hospital, Boston, was

(Continued on page 48)

RADIUM

Radium has Won a Definite Place in

DERMATOLOGY
GYNECOLOGY
UROLOGY
GENERAL SURGERY

Let us send you clinical and descriptive literature.
Monthly Lecture Courses at Pittsburgh.

As a supplementary service, we offer RADON (radium emanation).

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Please send me data on radiumtherapy

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STOVARSOL

(REG. U. S. PATENT OFFICE)

Acetylamino-oxyphenylarsonic Acid

Indicated in Amebic Dysentery

Accepted by Council of Pharmacy and Chemistry A. M. A.

Distributed in bottles of 25 tablets, each tablet 0.25 grams
May be obtained through your druggist

Literature furnished on request

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POWERS-WEIGHTMAN-ROSENGARTEN CO.

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THE REJUVENATION OF CREOSOTE

The value of creosote, **especially as an adjunct in the treatment of tuberculosis and bronchitis** has long been recognized, its use having been limited only because of difficulties of administering the drug in sufficient dosage without causing gastric distress. These objections have been largely overcome through the use of Calcreose.

Calcreose (calcium creosotate) is a loose chemical combination of creosote (50%) and calcium hydrate from which the creosote is slowly released in the body.

Calcreose may be administered in large doses over long periods of time, apparently without causing gastric distress.

Calcreose The Maltbie Chemical Co., Newark, N. J.

SAMPLES AND LITERATURE SUPPLIED UPON REQUEST.

Oats Now Cooked Quickly and Easily as Plain Toast

That means the "milk and oats" breakfast you advocate is now a "quick dish"

WE'LL thank you, doctor, to tell wives and mothers this news about oats. Many of them still consider oats a hard-to-prepare dish.

Quick Quaker cooks in 3 to 5 minutes! That's as quick as plain toast. It's ready, rich and flavory, while the coffee cooks.

All in all, it solves the breakfast problem in every way. It provides the kind of food *you* want your patients to have. It provides busy women, with limited cooking time mornings, a way to have it easily.

All that rare Quaker flavor is there. Quick Quaker cooks faster than Quaker Oats. That's the only difference. Both kinds are now at all grocers.

Standard full size and weight packages—
Medium: 1¼ pounds;
Large: 3 pounds, 7 oz.

Cooks in 3 to 5 minutes

The kind you have always known

(Continued from page 46)

recently appointed Assistant Professor of Pathology at Vanderbilt University Medical School, Nashville.

Mrs. Katie Bell Conyers, a teacher in the Memphis public schools, has been awarded a health scholarship for $500 in a contest among students in a special course in public health for school teachers, conducted by the Superintendent of Health of Memphis. The object of this was to furnish teachers special instruction along public health lines, so that their pupils might develop good health habits. The award was provided by the Metropolitan Life Insurance Company.

Dr. Beverly Douglas has returned to Nashville after spending fifteen months in the leading surgical clinics of Europe. He received a degree of Doctor of Science from the University of Lyons. Dr. Douglas will be connected with the Chair of Surgery of the School of Medicine, Vanderbilt University.

Dr. Hermon Hawkins has been appointed City Health Officer of Jackson, succeeding Dr. Frank Murtaugh.

Dr. Henry Hunton Hampton, Chattanooga, and Miss Dorothy Detrick, Caldwell, Kan., were married June 2.

Deaths

Dr. Douglas D. Weems, Greenville, aged 60, died May 26 of anemia.

Dr. E. S. Rogers, Knoxville, aged 81, died June 27.

Dr. L. Hulbert Milligan, Morristown, aged 60, died May 22 of chronic nephritis.

Dr. Thomas Edgar Nelson, Brighton, aged 64, died June 13 following a long illness.

Dr. William B. Moore, Brownsville, aged 89, died June 10.

TEXAS

The Valley Medical Society met in Brownsville recently. Dr. B. J. D. Stevens, Weslaco, was elected President; Dr. A. G. Padilla, Brownsville, Vice-President; Dr. J. G. Harrison, McAllen, Secretary.

Texas State Veterinary Association has elected the following officers: Dr. W. R. Sanderson, Brownwood, President; Drs. U. E. Marney, San Antonio, Raymond Childers, Beaumont, Vice-Presidents; Dr. D. Pearce, Leonard, Secretary-Treasurer.

(Continued on page 50)

A NEW ACCURACY IN BLOOD PRESSURE READINGS

Baumanometer

So gravely important are blood pressure readings successful physicians take no chances. Thousands have laid aside old instruments and adopted the Baumanometer for greater accuracy.

$2.00 BRINGS IT TO YOU

Employing Nature's Immutable Law Insures Absolute Accuracy

The unfailing reliability of gravitation method made use of. The scale of every instrument individually hand calibrated, another fundamental of scientific accuracy. Cannot spill; no air-pockets. The variation of other instruments of 10 to 30 mm. impossible.

Dr. Janeway, Johns Hopkins, Recommends It

Rockefeller Institute, Mayo Clinic, Yale and Harvard Medical Schools and many others use it. Metropolitan Life Insurance Co. bought 1000. Portable desk model (14½x4¾x2½ inches). With Free Manual.

10 DAYS' TRIAL—EASY TERMS

Send just $2.00 and we will forward it to you at once. Try it. If not thoroughly satisfied return and get your money back. If perfectly satisfied, send the balance in ten monthly installments of $3.00 each; without interest—$32.00 in all complete, which is the regular cash price everywhere.

SIGN AND MAIL COUPON

A. S. ALOE CO., 581 OLIVE ST., ST. LOUIS, MO.
I enclose first payment, $2.00. Send Baumanometer complete on 10-days' trial. If I keep it, I will pay balance, $30.00, in 10 monthly payments of $3.00, without interest. I agree title remains in you until paid in full.

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Address.....

RADIUM

PLATINUM-IRIDIUM needles as developed by the Research Laboratories of the United States Radium Corporation are considered indispensable by many important Radium therapists.

YOUR RADIUM will be adapted to a greater variety of conditions if it is placed in the United States Radium Corporation small Platinum - Iridium needles.

OUR COOPERATION begins with Post Graduate instruction including clinical demonstrations at recognized institutions and continues to fulfill every need of Radium users.

United States Radium Corporation

30 CHURCH STREET, NEW YORK — MINERS AND REFINERS OF RADIUM

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HAVE you sent for your sample of Lactogen?

—which is for infants 1 to 7 months of age;

—which is simply a full-cream cow's milk scientifically homogenized and desiccated;

—which is prepared by the Nestlé's Food Co., especially for the use of physicians, and sold only on their recommendation or prescription.

We believe that Lactogen, the natural food for Infants, exactly meets your own ideas on infant feeding.

We feel sure your clinical experience with Lactogen will verify our belief.

Let us send you a sample tin. Please use the coupon now.

H101

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Please send, without charge, complete information on Nestlé's Lactogen, together with samples.

*Name*_____ *Street*_____

*Town or City*_____ *State*_____

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OVER A HALF CENTURY OF SERVICE TO HOSPITALS AND PHYSICIANS IN THE SOUTH

X-Ray and Physiotherapy Apparatus
Ultra Violet Lamps

Catalogues on Request

NEW ORLEANS

(Continued from page 48)

The annual meeting of the Texas State Board of Dental Examiners was held in Dallas on June 10. Dr. Ralph C. Cooley, Houston, was elected President; Dr. W. O. Talbot, Fort Worth, Vice-President; Dr. G. C. Baker, Kaufman, Secretary-Treasurer.

The Texas State Dental Society met in San Antonio recently. The following officers were elected: Dr. Trim Houston, Corsicana, President-Elect; Dr. E. L. Williams Houston, Vice-President; Dr. J. F. Fife, Dallas, Secretary-Treasurer.

The Hermann Hospital, Houston, was formally opened July 1. It has a capacity of 275 beds.

The new laboratory building at the University of Texas, Department of Medicine, Galveston, will be ready for occupancy August 1.

The $1,000,000 Methodist Hospital, Fort Worth, was formally dedicated on July 1. Citizens of Fort Worth contributed $500,000 and the Methodists of the Central Texas Conference contributed a like amount for the erection of the hospital. It will be a nine-story building, and in each room will be installed a radio for the entertainment of the patient.

A new twenty-bed hospital for the exclusive use of negroes, erected under the auspices of the Sons and Daughters of Mercy, was opened in Denison recently. Dr. R. C. Riddle will be in charge of the institution.

The Tarrant County Medical Society, Fort Worth, has considered two sets of plans for a Medical Arts Building and adopted recommendations of the building committee, authorizing the committee to contract with a company they recommended for the construction of the Medical Arts Building.

The Houston Medical Arts Building will be a sixteen-story structure. The total cost of the building is estimated at approximately $2,000,000.

The following have been appointed members of the State Board of Health: Drs. Murff F. Bledsoe, Port Arthur; Robert W. Noble, Temple; Edward L. Rose, Port Arthur; Albert H. Braden, Houston; Eugene L. Lawrence, Thorn-

(Continued on page 52)

The Management of an Infant's Diet

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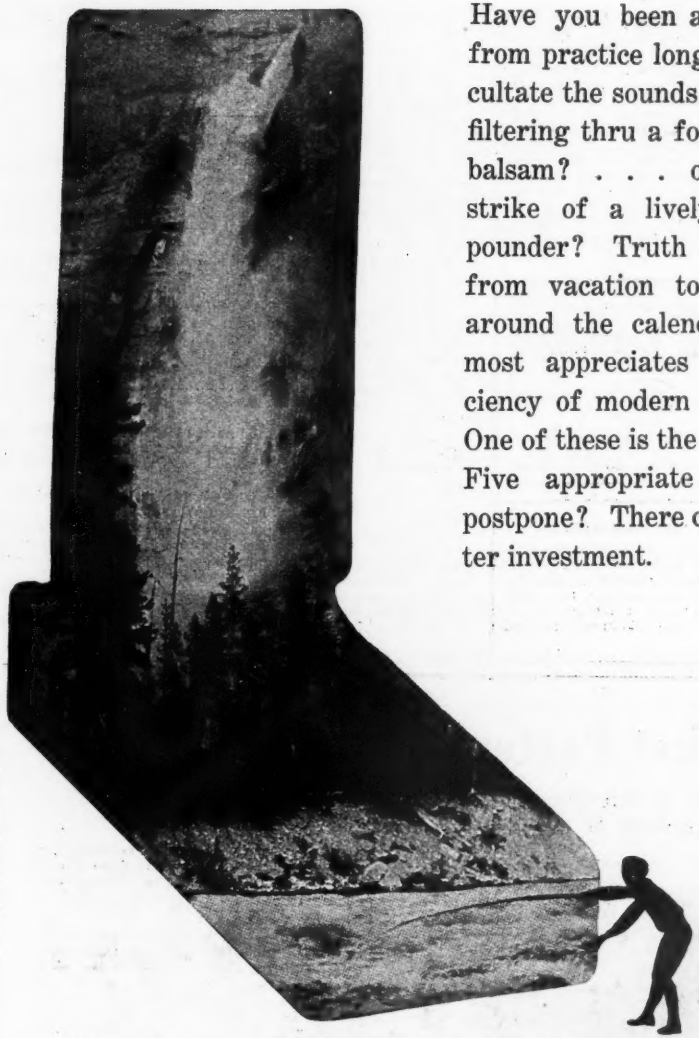

Takakkaw Falls in the Yoho Valley of British Columbia—Courtesy Canadian Pacific

Have you been able to get away from practice long enough to auscultate the sounds of silvery spray filtering thru a forest fragrant of balsam? . . . or to palpate the strike of a lively speckled six-pounder? Truth is, coming back from vacation to a fresh start around the calendar is when one most appreciates the loyal efficiency of modern diagnostic aids. One of these is the Baumanometer. Five appropriate models. Why postpone? There couldn't be a better investment.

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(Continued from page 50)

dale; Phil Russell, Fort Worth. Dr. Harry O. Sappington, State Health Officer, is President and Executive Officer of the Board.

Miss Pearl Hubbard has been appointed Superintendent of the new Deaf Smith County Sanitarium, Hereford, succeeding Mrs. Nettie Price, resigned.

Dr. J. T. Montgomery, Medical Examiner of the Southland Life Insurance Company, Dallas, has been elected to the Board of Managers of the Medical Section of the American Life Convention and, in three years, will automatically become Chairman of the Board of Control of the American Life Convention, the highest honor which can come to a life insurance company medical examiner.

Mr. C. L. Wakefield was recently re-elected Chairman of the Board of Managers of the City-County Hospital system, Dallas.

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Deaths

Dr. Henry Ludlow Rugeley, Bay City, aged 87, died May 6.

Dr. Edward E. Bryson, Pittsburg, aged 66, died May 31, at a sanatorium in Dallas.

Dr. Harry F. Blailock, Waco, aged 50, died June 12.

Dr. John Lee Elder, Dallas, aged 58, died June 22 at Oakland, Calif.

VIRGINIA

The annual meeting of the Medical Society of Virginia will be held in Richmond October 13-16.

Norfolk County Medical Society has elected Dr. Stanley H. Graves, President; Dr. J. Warren White, Vice-President; Dr. Lockburn B. Scott, re-elected Secretary-Treasurer. All of Norfolk.

Hampden-Sidney College Alumni organized an association at Lynchburg in June. Dr. James Morrison was elected President; Dr. J. Paulett Clark, Vice-President.

The Galax Hospital and Clinic, Galax, opened recently. The following doctors compose the staff: Dr. J. K. Caldwell, Internal Medicine; Dr. A. L. Jones, Surgery and Operative Gynecology; Dr. Z. G. Phipps, Obstetrics, Diseases of Women and Children and Medical Gynecology; Dr. John C. Phipps, Diseases of the Eye, Ear, Nose and Throat; Dr. W. P. Davis, X-ray; Dr. R. S. Kyle, Microscopic and Laboratory.

Richmond has been selected as the site for the new Shriner Hospital for Crippled Children, according to recent announcement. The structure will cost approximately $150,000.

Dr. F. A. Sinclair, Newport News, has been elected Surgeon of the Veterans of Foreign Wars.

On August 18, during an electrical storm, the home of Dr. Hugh C. Henry, of Central State Hospital, Petersburg, was struck by lightning and damaged to the extent of about $500. Members of the family were uninjured.

Dr. Bernard H. Kyle, Lynchburg, has been elected one of the Vice-Presidents of the Lions Club.

Dr. Cora Z. Corpening has resigned from the staff of

(Continued on page 54)

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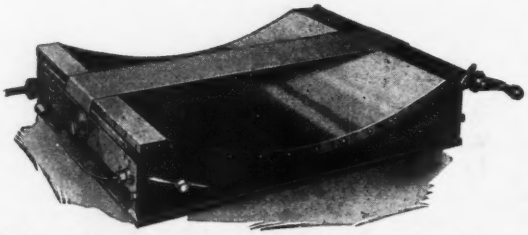

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LEESBURG, VA.

(Continued from page 52)

Lakeview Hospital, Suffolk, and will enter private practice at Virginia Beach.

Miss Sue Davidson, Alexandria, has been appointed Superintendent of the Mary Washington Hospital, Fredericksburg.

Dr. John Shelton Horsley, Jr., and Miss Lillian Waller Holladay, both of Richmond, were married June 24.

Dr. Percy Everett Schools and Miss Evelyn Mallory, both of Richmond, were married June 3.

Deaths

Dr. Virginius Williams Harrison, Richmond, aged 60, died in June.

Dr. Malcolm Graham Robinson, Wytheville, aged 54, died June 25.

Dr. Oscar Littleton Powell, Onancock, aged 50, died June 25 following a long illness.

WEST VIRGINIA

A drive for $500,000 for the erection of the Huntington Memorial Hospital, Huntington, will be begun soon.

Dr. Joseph E. Rader was recently appointed City Health Officer of Huntington, and Drs. Benjamin L. Hume, Charles L. Hopkins, Joseph C. Ford and Simpson A. Smith were appointed City Physicians.

Following the recent passage of the bill creating a state board of chiropractic examiners, the governor has appointed two chiropractors as members of the West Virginia Public Health Council.

Dr. Wm. H. McLain has been reappointed Health Commissioner of Wheeling.

Dr. Virgil D. Guittard, Wheeling, County Health Officer, has resigned and accepted a similar position in Michigan. Dr. Charles C. Hedges, Grafton, succeeds him.

Dr. Lucian N. Yost, Fairmont, Health Officer of Marion County, has resigned to enter private practice.

Deaths

Dr. Bernard Henry Lovely, Welch, aged 33, died suddenly in June.

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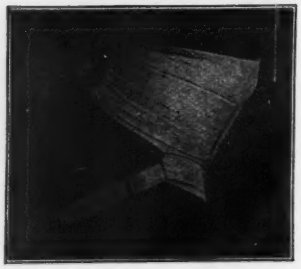

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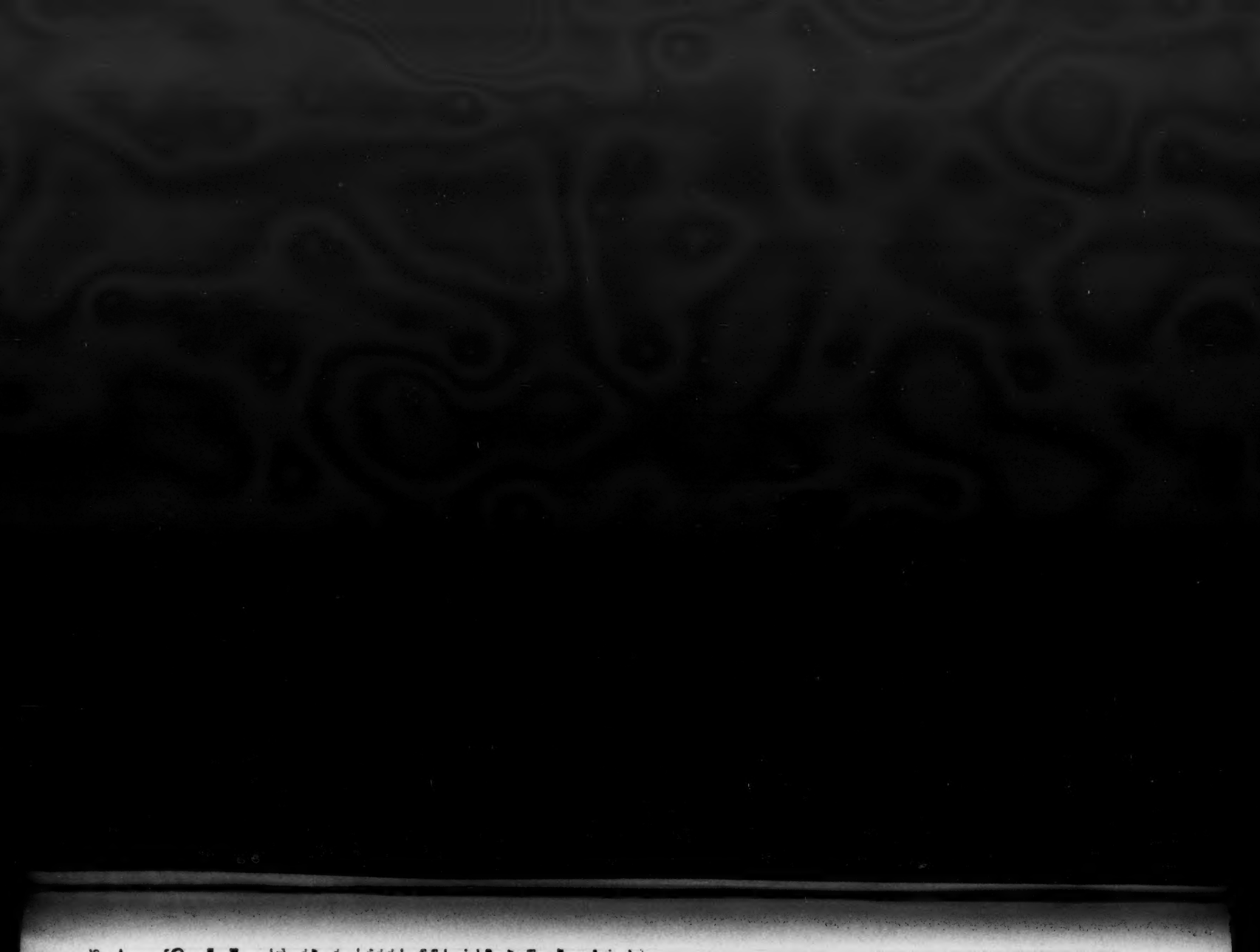

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